

Attachment F-1

Total Copper: 2013 STATS.exe Evaluation and Facility Effluent Data

STATS.exe Output: Facility = McKenney STP

2/5/2013 1:06:09 PM

Facility = McKenney STP
Chemical = Copper, Dissolved
Chronic averaging period = 4
WLAa = 0.04
WLAc = 0.028
Q.L. = 0.002
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = .013620
Variance = .000005
C.V. = 0.174715
97th percentile daily values = .018591
97th percentile 4 day average = .015986
97th percentile 30 day average = .014437
< Q.L. = 0
Model used = lognormal

No Limit is required for this material

The data are:

0.01
0.016
0.013
0.012
0.012
0.017
0.013
0.017
0.014
0.012

All data in mg/L



B & B Consultants, Inc.
Engineers-Architects Planners-Lab Analysts

P.O. Box 429 – 212 E. Ferrell Street
South Hill, Virginia 23970
(434) 447-7621 – FAX: (434) 447-4257
email: bandb@bandbcons.com

LETTER OF TRANSMITTAL

DATE February 17, 2009 JOB NO. _____

ATTENTION

Tamira Cohen, Environmental Engineer, Sr.

RE: Town of McKenney
VPDES Permit Reissuance Application

RECEIVED
FEB 18 2009
PRO

To: **Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, Virginia 23060**

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via 1st Class Mail the following items.

- ☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change Order ☒ Listed Below

COPIES	DATE	NO.	DESCRIPTION
1 ea			Results for 10 additional copper test as per your 1-15-09 email

THESE ARE TRANSMITTED as checked below:

- ☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☒ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS:

COPY TO: _____

SIGNED: Mac Bugg:med

CLIENT: B & B Consultants
 ATTN: Denise Longo
 ADDRESS: P. O. Box 101
 Chase City, VA 23924-0101
 PHONE: (434) 372-3393
 FAX: (434) 372-0709

Special Notes:

SAMPLE COLLECTED BY: CLIENT

GRAB COLLECTION:

Date: 1/21/09 Time: 1500

COMPOSITE COLLECTION:

Start Date: Time:

End Date: Time:

PICK UP BY: UPS

SAMPLE RECEIPT:

Date: 2/4/09 Time: 0935

NUMBER OF CONTAINERS: 1

SAMPLE CONDITION: ☒ Good ☐ Other (See C-O-C)



SAMPLE ID: MCKENNEY EFF 9-0267

SAMPLE NO: 09-01962

Parameter	Method Number	JRA QL	Result	Unit	Analyst Date	Time
Total Copper	200.7	0.002	0.010	mg/L	TLG 2/9/09	1710

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.

Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED

Elaine Claiborne

Elaine Claiborne
 Laboratory Director

Date: 10-Feb-09

CLIENT: B & B Consultants
ATTN: Denise Longo
ADDRESS: P. O. Box 101
Chase City, VA 23924-0101
PHONE: (434) 372-3393
FAX: (434) 372-0709

Special Notes:

SAMPLE COLLECTED BY: CLIENT

GRAB COLLECTION:

Date: 1/22/09 Time: 0700

COMPOSITE COLLECTION:

Start Date: Time:

End Date: Time:

PICK UP BY: UPS

SAMPLE RECEIPT:

Date: 2/4/09 Time: 0935

NUMBER OF CONTAINERS: 1

SAMPLE CONDITION: ☒ Good ☐ Other (See C-O-C)



SAMPLE ID: MCKENNEY EFF 9-0268

SAMPLE NO: 09-01963

Parameter	Method Number	JRA QL	Result	Unit	Analyst Date	Time
Total Copper	200.7	0.002	0.016	mg/L	TLG 2/9/09	1716

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.

Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED

Elaine Claiborne
Laboratory Director

Date: 10-Feb-09

CLIENT: B & B Consultants
ATTN: Denise Longo
ADDRESS: P. O. Box 101
Chase City, VA 23924-0101
PHONE: (434) 372-3393
FAX: (434) 372-0709

Special Notes:

SAMPLE COLLECTED BY: CLIENT

GRAB COLLECTION:

Date: 1/23/09 Time: 0930

COMPOSITE COLLECTION:

Start Date: Time:

End Date: Time:

PICK UP BY: UPS

SAMPLE RECEIPT:

Date: 2/4/09 Time: 0935

NUMBER OF CONTAINERS: 1

SAMPLE CONDITION: ☒ Good ☐ Other (See C-O-C)



SAMPLE ID: MCKENNEY EFF 9-0269

SAMPLE NO: 09-01964

Parameter	Method Number	JRA QL	Result	Unit	Analyst	Date	Time
Total Copper	200.7	0.002	0.013	mg/L	TLG	2/9/09	1718

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.

Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED

Elaine Claiborne
Laboratory Director

Date: 10-Feb-09

CLIENT: B & B Consultants
ATTN: Denise Longo
ADDRESS: P. O. Box 101
Chase City, VA 23924-0101
PHONE: (434) 372-3393
FAX: (434) 372-0709

Special Notes:

SAMPLE COLLECTED BY: CLIENT

GRAB COLLECTION:

Date: 1/24/09 Time: 1100

COMPOSITE COLLECTION:

Start Date: Time:

End Date: Time:

PICK UP BY: UPS

SAMPLE RECEIPT:

Date: 2/4/09 Time: 0935

NUMBER OF CONTAINERS: 1

SAMPLE CONDITION: ☒ Good ☐ Other (See C-O-C)



SAMPLE ID: MCKENNEY EFF 9-0270

SAMPLE NO: 09-01965

Parameter	Method Number	JRA QL	Result	Unit	Analyst	Date	Time
Total Copper	200.7	0.002	0.012	mg/L	TLG	2/9/09	1727

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.

Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED

Elaine Claiborne

Elaine Claiborne
Laboratory Director

Date: 10-Feb-09

CLIENT: B & B Consultants
ATTN: Denise Longo
ADDRESS: P. O. Box 101
Chase City, VA 23924-0101
PHONE: (434) 372-3393
FAX: (434) 372-0709

Special Notes:

SAMPLE COLLECTED BY: CLIENT

GRAB COLLECTION:

Date: 1/25/09 Time: 1515

COMPOSITE COLLECTION:

Start Date: Time:

End Date: Time:

PICK UP BY: UPS

SAMPLE RECEIPT:

Date: 2/4/09 Time: 0935

NUMBER OF CONTAINERS: 1

SAMPLE CONDITION: ☒ Good ☐ Other (See C-O-C)



SAMPLE ID: MCKENNEY EFF 9-0271

SAMPLE NO: 09-01966

Parameter	Method Number	JRA QL	Result	Unit	Analyst	Date	Time
Total Copper	200.7	0.002	0.012	mg/L	TLG	2/9/09	1729

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.

Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED

Elaine Claiborne
Laboratory Director

Date: 10-Feb-09

CLIENT: B & B Consultants
ATTN: Denise Longo
ADDRESS: P. O. Box 101
Chase City, VA 23924-0101
PHONE: (434) 372-3393
FAX: (434) 372-0709

Special Notes:

SAMPLE COLLECTED BY: CLIENT

GRAB COLLECTION:

Date: 1/26/09 Time: 1000

COMPOSITE COLLECTION:

Start Date: Time:

End Date: Time:

PICK UP BY: UPS

SAMPLE RECEIPT:

Date: 2/4/09 Time: 0935

NUMBER OF CONTAINERS: 1

SAMPLE CONDITION: ☒ Good ☐ Other (See C-O-C)



SAMPLE ID: MCKENNEY EFF 9-0272

SAMPLE NO: 09-01967

Parameter	Method Number	JRA QL	Result	Unit	Analyst Date	Time
Total Copper	200.7	0.002	0.017	mg/L	TLG 2/9/09	1731

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.

Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED

Elaine Claiborne

Elaine Claiborne
Laboratory Director

Date: 10-Feb-09

CLIENT: B & B Consultants
ATTN: Denise Longo
ADDRESS: P. O. Box 101
Chase City, VA 23924-0101
PHONE: (434) 372-3393
FAX: (434) 372-0709

Special Notes:

SAMPLE COLLECTED BY: CLIENT

GRAB COLLECTION:

Date: 1/27/09 Time: 0830

COMPOSITE COLLECTION:

Start Date: Time:

End Date: Time:

PICK UP BY: UPS

SAMPLE RECEIPT:

Date: 2/4/09 Time: 0935

NUMBER OF CONTAINERS: 1

SAMPLE CONDITION: ☒ Good ☐ Other (See C-O-C)



SAMPLE ID: MCKENNEY EFF 9-0273

SAMPLE NO: 09-01968

Parameter	Method Number	JRA QL	Result	Unit	Analyst	Date	Time
Total Copper	200.7	0.002	0.013	mg/L	TLG	2/9/09	1733

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.

Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED

Elaine Claiborne
Laboratory Director

Date: 10-Feb-09

CLIENT: B & B Consultants
ATTN: Denise Longo
ADDRESS: P. O. Box 101
Chase City, VA 23924-0101
PHONE: (434) 372-3393
FAX: (434) 372-0709

Special Notes:

SAMPLE COLLECTED BY: CLIENT

GRAB COLLECTION:

Date: 1/28/09 Time: 1500

COMPOSITE COLLECTION:

Start Date: Time:

End Date: Time:

PICK UP BY: UPS

SAMPLE RECEIPT:

Date: 2/4/09 Time: 0935

NUMBER OF CONTAINERS: 1

SAMPLE CONDITION: ☒ Good ☐ Other (See C-O-C)



SAMPLE ID: MCKENNEY EFF 9-0274
SAMPLE NO: 09-01969

Parameter	Method Number	JRA QL	Result	Unit	Analyst	Date	Time
Total Copper	200.7	0.002	0.017	mg/L	TLG	2/9/09	1735

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.


Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED

Elaine Claiborne

Elaine Claiborne
Laboratory Director

Date: 10-Feb-09

CLIENT: B & B Consultants	SAMPLE COLLECTED BY: CLIENT	
ATTN: Denise Longo	GRAB COLLECTION:	
ADDRESS: P. O. Box 101	Date: 1/29/09 Time: 1210	
Chase City, VA 23924-0101	COMPOSITE COLLECTION:	
PHONE: (434) 372-3393	Start Date: Time:	
FAX: (434) 372-0709	End Date: Time:	
Special Notes:	PICK UP BY: UPS	
	SAMPLE RECEIPT:	
	Date: 2/4/09 Time: 0935	
	NUMBER OF CONTAINERS: 1	
	SAMPLE CONDITION: <input checked="" type="checkbox"/> Good <input type="checkbox"/> Other (See C-O-C)	


SAMPLE ID: MCKENNEY EFF 9-0275
SAMPLE NO: 09-01970

Parameter	Method Number	JRA QL	Result	Unit	Analyst Date	Time
Total Copper	200.7	0.002	0.014	mg/L	TLG 2/9/09	1737

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.
Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED


Elaine Claiborne
Laboratory Director
Date: 10-Feb-09

CLIENT: B & B Consultants
ATTN: Denise Longo
ADDRESS: P. O. Box 101
Chase City, VA 23924-0101
PHONE: (434) 372-3393
FAX: (434) 372-0709

Special Notes:

SAMPLE COLLECTED BY: CLIENT

GRAB COLLECTION:

Date: 1/30/09 Time: 1020

COMPOSITE COLLECTION:

Start Date: Time:

End Date: Time:

PICK UP BY: UPS

SAMPLE RECEIPT:

Date: 2/4/09 Time: 0935

NUMBER OF CONTAINERS: 1

SAMPLE CONDITION: ☒ Good ☐ Other (See C-O-C)



SAMPLE ID: MCKENNEY EFF 9-0276

SAMPLE NO: 09-01971

Parameter	Method Number	JRA QL	Result	Unit	Analyst Date	Time
Total Copper	200.7	0.002	0.012	mg/L	TLG 2/9/09	1739

NOTES:

JRA Quantification Level is the concentration of the lowest calibration standard above zero with a reliable signal.

Reproduction of this report is not permitted, except in full, without written approval from James R Reed & Associates.

RESPECTFULLY SUBMITTED

Elaine Claiborne
Laboratory Director
Date: 10-Feb-09

Attachment G-1

2009 and 2013 MSTRANTI Printouts

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: **McKenney WWTP**

Permit No.: **VA0060402 (2009 Permit Reissuance)**

Receiving Stream: **Great Creek**

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	16.4 mg/L
90% Temperature (Annual) =	22.9 deg C
90% Temperature (Wet season) =	deg C
90% Maximum pH =	6.9 SU
10% Maximum pH =	6.3 SU
Tier Designation (1 or 2) =	1
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0 MGD
7Q10 (Annual) =	0 MGD
30Q10 (Annual) =	0 MGD
1Q10 (Wet season) =	0.003 MGD
30Q10 (Wet season) =	0.021 MGD
30Q5 =	0 MGD
Harmonic Mean =	0.005 MGD
Annual Average =	MGD

Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO3) =	68 mg/L
90% Temp (Annual) =	23.1 deg C
90% Temp (Wet season) =	21.4 deg C
90% Maximum pH =	6.65 SU
10% Maximum pH =	6.2 SU
Discharge Flow =	0.1 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	2.7E+03	--	--	na	2.7E+03	--	--	--	--	--	--	--	--	--	--	na	2.7E+03
Acrolein	0	--	--	na	7.8E+02	--	--	na	7.8E+02	--	--	--	--	--	--	--	--	--	--	na	7.8E+02
Acrylonitrile ^C	0	--	--	na	6.6E+00	--	--	na	6.9E+00	--	--	--	--	--	--	--	--	--	--	na	6.9E+00
Aldrin ^C	0	3.0E+00	--	na	1.4E-03	3.0E+00	--	na	1.5E-03	--	--	--	--	--	--	--	--	3.0E+00	--	na	1.5E-03
Ammonia-N (mg/l) (Yearly)	0	4.57E+01	3.74E+00	na	--	4.6E+01	3.7E+00	na	--	--	--	--	--	--	--	--	--	4.6E+01	3.7E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	4.56E+01	5.27E+00	na	--	4.7E+01	6.4E+00	na	--	--	--	--	--	--	--	--	--	4.7E+01	6.4E+00	na	--
Anthracene	0	--	--	na	1.1E+05	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
Antimony	0	--	--	na	4.3E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene ^C	0	--	--	na	7.1E+02	--	--	na	7.5E+02	--	--	--	--	--	--	--	--	--	--	na	7.5E+02
Benzidine ^C	0	--	--	na	5.4E-03	--	--	na	5.7E-03	--	--	--	--	--	--	--	--	--	--	na	5.7E-03
Benzo (a) anthracene ^C	0	--	--	na	4.9E-01	--	--	na	5.1E-01	--	--	--	--	--	--	--	--	--	--	na	5.1E-01
Benzo (b) fluoranthene ^C	0	--	--	na	4.9E-01	--	--	na	5.1E-01	--	--	--	--	--	--	--	--	--	--	na	5.1E-01
Benzo (k) fluoranthene ^C	0	--	--	na	4.9E-01	--	--	na	5.1E-01	--	--	--	--	--	--	--	--	--	--	na	5.1E-01
Benzo (a) pyrene ^C	0	--	--	na	4.9E-01	--	--	na	5.1E-01	--	--	--	--	--	--	--	--	--	--	na	5.1E-01
Bis2-Chloroethyl Ether	0	--	--	na	1.4E+01	--	--	na	1.4E+01	--	--	--	--	--	--	--	--	--	--	na	1.4E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	1.7E+05	--	--	na	1.7E+05	--	--	--	--	--	--	--	--	--	--	na	1.7E+05
Bromoform ^C	0	--	--	na	3.6E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Butylbenzylphthalate	0	--	--	na	5.2E+03	--	--	na	5.2E+03	--	--	--	--	--	--	--	--	--	--	na	5.2E+03
Cadmium	0	2.5E+00	8.4E-01	na	--	2.5E+00	8.4E-01	na	--	--	--	--	--	--	--	--	--	2.5E+00	8.4E-01	na	--
Carbon Tetrachloride ^C	0	--	--	na	4.4E+01	--	--	na	4.6E+01	--	--	--	--	--	--	--	--	--	--	na	4.6E+01
Chlordane ^C	0	2.4E+00	4.3E-03	na	2.2E-02	2.4E+00	4.3E-03	na	2.3E-02	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	2.3E-02
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^C	0	--	--	na	3.4E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Chloroform ^C	0	--	--	na	2.9E+04	--	--	na	3.0E+04	--	--	--	--	--	--	--	--	--	--	na	3.0E+04
2-Chloronaphthalene	0	--	--	na	4.3E+03	--	--	na	4.3E+03	--	--	--	--	--	--	--	--	--	--	na	4.3E+03
2-Chlorophenol	0	--	--	na	4.0E+02	--	--	na	4.0E+02	--	--	--	--	--	--	--	--	--	--	na	4.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	4.2E+02	5.4E+01	na	--	4.2E+02	5.4E+01	na	--	--	--	--	--	--	--	--	--	4.2E+02	5.4E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene ^C	0	--	--	na	4.9E-01	--	--	na	5.1E-01	--	--	--	--	--	--	--	--	--	--	na	5.1E-01
Copper	0	9.3E+00	6.4E+00	na	--	9.3E+00	6.4E+00	na	--	--	--	--	--	--	--	--	--	9.3E+00	6.4E+00	na	--
Cyanide	0	2.2E+01	5.2E+00	na	2.2E+05	2.2E+01	5.2E+00	na	2.2E+05	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	2.2E+05
DDD ^C	0	--	--	na	8.4E-03	--	--	na	8.8E-03	--	--	--	--	--	--	--	--	--	--	na	8.8E-03
DDE ^C	0	--	--	na	5.9E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDT ^C	0	1.1E+00	1.0E-03	na	5.9E-03	1.1E+00	1.0E-03	na	6.2E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	6.2E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Dibenz(a,h)anthracene ^C	0	--	--	na	4.9E-01	--	--	na	5.1E-01	--	--	--	--	--	--	--	--	--	--	na	5.1E-01
Dibutyl phthalate	0	--	--	na	1.2E+04	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Dichloromethane (Methylene Chloride) ^C	0	--	--	na	1.6E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,2-Dichlorobenzene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,3-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,4-Dichlorobenzene	0	--	--	na	2.6E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
3,3-Dichlorobenzidine ^C	0	--	--	na	7.7E-01	--	--	na	8.1E-01	--	--	--	--	--	--	--	--	--	--	na	8.1E-01
Dichlorobromomethane ^C	0	--	--	na	4.6E+02	--	--	na	4.8E+02	--	--	--	--	--	--	--	--	--	--	na	4.8E+02
1,2-Dichloroethane ^C	0	--	--	na	9.9E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
1,1-Dichloroethylene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
1,2-trans-dichloroethylene	0	--	--	na	1.4E+05	--	--	na	1.4E+05	--	--	--	--	--	--	--	--	--	--	na	1.4E+05
2,4-Dichlorophenol	0	--	--	na	7.9E+02	--	--	na	7.9E+02	--	--	--	--	--	--	--	--	--	--	na	7.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane ^C	0	--	--	na	3.9E+02	--	--	na	4.1E+02	--	--	--	--	--	--	--	--	--	--	na	4.1E+02
1,3-Dichloropropene	0	--	--	na	1.7E+03	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dieldrin ^C	0	2.4E-01	5.6E-02	na	1.4E-03	2.4E-01	5.6E-02	na	1.5E-03	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	1.5E-03
Diethyl Phthalate	0	--	--	na	1.2E+05	--	--	na	1.2E+05	--	--	--	--	--	--	--	--	--	--	na	1.2E+05
Di-2-Ethylhexyl Phthalate ^C	0	--	--	na	5.9E+01	--	--	na	6.2E+01	--	--	--	--	--	--	--	--	--	--	na	6.2E+01
2,4-Dimethylphenol	0	--	--	na	2.3E+03	--	--	na	2.3E+03	--	--	--	--	--	--	--	--	--	--	na	2.3E+03
Dimethyl Phthalate	0	--	--	na	2.9E+06	--	--	na	2.9E+06	--	--	--	--	--	--	--	--	--	--	na	2.9E+06
Di-n-Butyl Phthalate	0	--	--	na	1.2E+04	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
2,4 Dinitrophenol	0	--	--	na	1.4E+04	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	7.65E+02	--	--	na	7.7E+02	--	--	--	--	--	--	--	--	--	--	na	7.7E+02
2,4-Dinitrotoluene ^C	0	--	--	na	9.1E+01	--	--	na	9.6E+01	--	--	--	--	--	--	--	--	--	--	na	9.6E+01
Dioxin (2,3,7,8- tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	na	1.2E-06	--	--	na	na	--	--	--	--	--	--	--	--	--	--	na	na
1,2-Diphenylhydrazine ^C	0	--	--	na	5.4E+00	--	--	na	5.7E+00	--	--	--	--	--	--	--	--	--	--	na	5.7E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.4E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.4E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	2.2E-01	5.6E-02	na	2.4E+02	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	2.4E+02
Endosulfan Sulfate	0	--	--	na	2.4E+02	--	--	na	2.4E+02	--	--	--	--	--	--	--	--	--	--	na	2.4E+02
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	8.6E-02	3.6E-02	na	8.1E-01	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	8.1E-01
Endrin Aldehyde	0	--	--	na	8.1E-01	--	--	na	8.1E-01	--	--	--	--	--	--	--	--	--	--	na	8.1E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.9E+04	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04
Fluoranthene	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	3.7E+02
Fluorene	0	--	--	na	1.4E+04	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor ^C	0	5.2E-01	3.8E-03	na	2.1E-03	5.2E-01	3.8E-03	na	2.2E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	2.2E-03
Heptachlor Epoxide ^C	0	5.2E-01	3.8E-03	na	1.1E-03	5.2E-01	3.8E-03	na	1.2E-03	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	1.2E-03
Hexachlorobenzene ^C	0	--	--	na	7.7E-03	--	--	na	8.1E-03	--	--	--	--	--	--	--	--	--	--	na	8.1E-03
Hexachlorobutadiene ^C	0	--	--	na	5.0E+02	--	--	na	5.3E+02	--	--	--	--	--	--	--	--	--	--	na	5.3E+02
Hexachlorocyclohexane																					
Alpha-BHC ^C	0	--	--	na	1.3E-01	--	--	na	1.4E-01	--	--	--	--	--	--	--	--	--	--	na	1.4E-01
Hexachlorocyclohexane																					
Beta-BHC ^C	0	--	--	na	4.6E-01	--	--	na	4.8E-01	--	--	--	--	--	--	--	--	--	--	na	4.8E-01
Hexachlorocyclohexane																					
Gamma-BHC ^C (Lindane)	0	9.5E-01	na	na	6.3E-01	9.5E-01	--	na	6.6E-01	--	--	--	--	--	--	--	--	9.5E-01	--	na	6.6E-01
Hexachlorocyclopentadiene	0	--	--	na	1.7E+04	--	--	na	1.7E+04	--	--	--	--	--	--	--	--	--	--	na	1.7E+04
Hexachloroethane ^C	0	--	--	na	8.9E+01	--	--	na	9.3E+01	--	--	--	--	--	--	--	--	--	--	na	9.3E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene ^C	0	--	--	na	4.9E-01	--	--	na	5.1E-01	--	--	--	--	--	--	--	--	--	--	na	5.1E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone ^C	0	--	--	na	2.6E+04	--	--	na	2.7E+04	--	--	--	--	--	--	--	--	--	--	na	2.7E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	7.3E+01	8.3E+00	na	--	7.3E+01	8.3E+00	na	--	--	--	--	--	--	--	--	--	7.3E+01	8.3E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	na	5.1E-02	1.4E+00	7.7E-01	na	5.1E-02	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	na	5.1E-02
Methyl Bromide	0	--	--	na	4.0E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Monochlorobenzene	0	--	--	na	2.1E+04	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
Nickel	0	1.3E+02	1.5E+01	na	4.6E+03	1.3E+02	1.5E+01	na	4.6E+03	--	--	--	--	--	--	--	--	1.3E+02	1.5E+01	na	4.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
N-Nitrosodimethylamine ^C	0	--	--	na	8.1E+01	--	--	na	8.5E+01	--	--	--	--	--	--	--	--	--	--	na	8.5E+01
N-Nitrosodiphenylamine ^C	0	--	--	na	1.6E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	na	1.7E+02
N-Nitrosodi-n-propylamine ^C	0	--	--	na	1.4E+01	--	--	na	1.5E+01	--	--	--	--	--	--	--	--	--	--	na	1.5E+01
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB-1016	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1221	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1232	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1242	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1248	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1254	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB-1260	0	--	1.4E-02	na	--	--	1.4E-02	na	--	--	--	--	--	--	--	--	--	--	1.4E-02	na	--
PCB Total ^C	0	--	--	na	1.7E-03	--	--	na	1.8E-03	--	--	--	--	--	--	--	--	--	--	na	1.8E-03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Pentachlorophenol ^C	0	3.9E+00	3.0E+00	na	8.2E+01	3.9E+00	3.0E+00	na	8.6E+01	--	--	--	--	--	--	--	--	3.9E+00	3.0E+00	na	8.6E+01
Phenol	0	--	--	na	4.6E+06	--	--	na	4.6E+06	--	--	--	--	--	--	--	--	--	--	na	4.6E+06
Pyrene	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Radionuclides (pCi/l except Beta/Photon)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity	0	--	--	na	1.5E+01	--	--	na	1.5E+01	--	--	--	--	--	--	--	--	--	--	na	1.5E+01
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Strontium-90	0	--	--	na	8.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Tritium	0	--	--	na	2.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
Selenium	0	2.0E+01	5.0E+00	na	1.1E+04	2.0E+01	5.0E+00	na	1.1E+04	--	--	--	--	--	--	--	--	2.0E+01	5.0E+00	na	1.1E+04
Silver	0	1.8E+00	--	na	--	1.8E+00	--	na	--	--	--	--	--	--	--	--	--	1.8E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	1.1E+02	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
Tetrachloroethylene ^C	0	--	--	na	8.9E+01	--	--	na	9.3E+01	--	--	--	--	--	--	--	--	--	--	na	9.3E+01
Thallium	0	--	--	na	6.3E+00	--	--	na	6.3E+00	--	--	--	--	--	--	--	--	--	--	na	6.3E+00
Toluene	0	--	--	na	2.0E+05	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	--	--	na	2.0E+05
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	7.5E-03	7.3E-01	2.0E-04	na	7.9E-03	--	--	--	--	--	--	--	--	7.3E-01	2.0E-04	na	7.9E-03
Tributyltin	0	4.6E-01	6.3E-02	na	--	4.6E-01	6.3E-02	na	--	--	--	--	--	--	--	--	--	4.6E-01	6.3E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	9.4E+02	--	--	na	9.4E+02	--	--	--	--	--	--	--	--	--	--	na	9.4E+02
1,1,2-Trichloroethane ^C	0	--	--	na	4.2E+02	--	--	na	4.4E+02	--	--	--	--	--	--	--	--	--	--	na	4.4E+02
Trichloroethylene ^C	0	--	--	na	8.1E+02	--	--	na	8.5E+02	--	--	--	--	--	--	--	--	--	--	na	8.5E+02
2,4,6-Trichlorophenol ^C	0	--	--	na	6.5E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	6.1E+01	--	--	na	6.4E+01	--	--	--	--	--	--	--	--	--	--	na	6.4E+01
Zinc	0	8.5E+01	8.5E+01	na	6.9E+04	8.5E+01	8.5E+01	na	6.9E+04	--	--	--	--	--	--	--	--	8.5E+01	8.5E+01	na	6.9E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	4.3E+03
Arsenic	9.0E+01
Barium	na
Cadmium	5.0E-01
Chromium III	3.2E+01
Chromium VI	6.4E+00
Copper	3.7E+00
Iron	na
Lead	5.0E+00
Manganese	na
Mercury	5.1E-02
Nickel	8.8E+00
Selenium	3.0E+00
Silver	7.1E-01
Zinc	3.4E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

changes from draft J: 1. Endrin Aldehyde criteria corrected

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: **McKenney STP**

Permit No.: **VA0060402 (2013 Permit Modification)**

Receiving Stream: **Great Creek**

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO ₃) =	16.4 mg/L
90% Temperature (Annual) =	22.9 deg C
90% Temperature (Wet season) =	deg C
90% Maximum pH =	6.9 SU
10% Maximum pH =	6.3 SU
Tier Designation (1 or 2) =	1
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0 MGD
7Q10 (Annual) =	0 MGD
30Q10 (Annual) =	0 MGD
1Q10 (Wet season) =	0.003 MGD
30Q10 (Wet season) =	0.021 MGD
3Q05 =	0 MGD
Harmonic Mean =	0.005 MGD

Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO ₃) =	68 mg/L
90% Temp (Annual) =	23.1 deg C
90% Temp (Wet season) =	21.4 deg C
90% Maximum pH =	6.65 SU
10% Maximum pH =	6.2 SU
Discharge Flow =	0.1 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	5	--	--	na	9.9E+02	--	--	na	9.9E+02	--	--	--	--	--	--	--	--	--	--	na	9.9E+02
Acrolein	0	--	--	na	9.3E+00	--	--	na	9.3E+00	--	--	--	--	--	--	--	--	--	--	na	9.3E+00
Acrylonitrile ^C	0	--	--	na	2.6E+00	--	--	na	2.6E+00	--	--	--	--	--	--	--	--	--	--	na	2.6E+00
Aldrin ^C	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	5.3E-04	--	--	--	--	--	--	--	--	3.0E+00	--	na	5.3E-04
Ammonia-N (mg/l) (Yearly)	0	4.57E+01	3.74E+00	na	--	4.57E+01	3.74E+00	na	--	--	--	--	--	--	--	--	--	4.57E+01	3.74E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	4.56E+01	5.27E+00	na	--	4.70E+01	6.38E+00	na	--	--	--	--	--	--	--	--	--	4.70E+01	6.38E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	4.0E+04	--	--	--	--	--	--	--	--	--	--	na	4.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	6.4E+02	--	--	--	--	--	--	--	--	--	--	na	6.4E+02
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene ^C	0	--	--	na	5.1E+02	--	--	na	5.4E+02	--	--	--	--	--	--	--	--	--	--	na	5.4E+02
Benzidine ^C	0	--	--	na	2.0E-03	--	--	na	2.1E-03	--	--	--	--	--	--	--	--	--	--	na	2.1E-03
Benzo (a) anthracene ^C	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Benzo (b) fluoranthene ^C	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Benzo (k) fluoranthene ^C	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Benzo (a) pyrene ^C	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Bis(2-Chloroethyl) Ether ^C	0	--	--	na	5.3E+00	--	--	na	5.6E+00	--	--	--	--	--	--	--	--	--	--	na	5.6E+00
Bis(2-Chloroisopropyl) Ether	0	--	--	na	6.5E+04	--	--	na	6.5E+04	--	--	--	--	--	--	--	--	--	--	na	6.5E+04
Bis 2-Ethylhexyl Phthalate ^C	0	--	--	na	2.2E+01	--	--	na	2.3E+01	--	--	--	--	--	--	--	--	--	--	na	2.3E+01
Bromoform ^C	0	--	--	na	1.4E+03	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
Cadmium	0	2.5E+00	8.4E-01	na	--	2.5E+00	8.4E-01	na	--	--	--	--	--	--	--	--	--	2.5E+00	8.4E-01	na	--
Carbon Tetrachloride ^C	0	--	--	na	1.6E+01	--	--	na	1.7E+01	--	--	--	--	--	--	--	--	--	--	na	1.7E+01
Chlordane ^C	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	8.5E-03	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	8.5E-03
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^C	0	--	--	na	1.3E+02	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	4.2E+02	5.4E+01	na	--	4.2E+02	5.4E+01	na	--	--	--	--	--	--	--	--	--	4.2E+02	5.4E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene ^C	0	--	--	na	1.8E-02	--	--	na	1.9E-02	--	--	--	--	--	--	--	--	--	--	na	1.9E-02
Copper	0	9.3E+00	6.4E+00	na	--	9.3E+00	6.4E+00	na	--	--	--	--	--	--	--	--	--	9.3E+00	6.4E+00	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	1.6E+04	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	1.6E+04
DDD ^C	0	--	--	na	3.1E-03	--	--	na	3.3E-03	--	--	--	--	--	--	--	--	--	--	na	3.3E-03
DDE ^C	0	--	--	na	2.2E-03	--	--	na	2.3E-03	--	--	--	--	--	--	--	--	--	--	na	2.3E-03
DDT ^C	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.3E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	2.3E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	na	--
Dibenz(a,h)anthracene ^C	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	9.6E+02	--	--	--	--	--	--	--	--	--	--	na	9.6E+02
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
3,3-Dichlorobenzidine ^C	0	--	--	na	2.8E-01	--	--	na	2.9E-01	--	--	--	--	--	--	--	--	--	--	na	2.9E-01
Dichlorobromomethane ^C	0	--	--	na	1.7E+02	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
1,2-Dichloroethane ^C	0	--	--	na	3.7E+02	--	--	na	3.9E+02	--	--	--	--	--	--	--	--	--	--	na	3.9E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	7.1E+03	--	--	--	--	--	--	--	--	--	--	na	7.1E+03
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	2.9E+02	--	--	--	--	--	--	--	--	--	--	na	2.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane ^C	0	--	--	na	1.5E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
1,3-Dichloropropene ^C	0	--	--	na	2.1E+02	--	--	na	2.2E+02	--	--	--	--	--	--	--	--	--	--	na	2.2E+02
Dieldrin ^C	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	5.7E-04	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	5.7E-04
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	4.4E+04	--	--	--	--	--	--	--	--	--	--	na	4.4E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	8.5E+02	--	--	--	--	--	--	--	--	--	--	na	8.5E+02
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.1E+06	--	--	--	--	--	--	--	--	--	--	na	1.1E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	--	--	na	5.3E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
2,4-Dinitrotoluene ^C	0	--	--	na	3.4E+01	--	--	na	3.6E+01	--	--	--	--	--	--	--	--	--	--	na	3.6E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	5.1E-08	--	--	--	--	--	--	--	--	--	--	na	5.1E-08
1,2-Diphenylhydrazine ^C	0	--	--	na	2.0E+00	--	--	na	2.1E+00	--	--	--	--	--	--	--	--	--	--	na	2.1E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	8.9E+01
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	8.9E+01
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	--	--	na	8.9E+01
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	6.0E-02	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	6.0E-02
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	--	--	na	3.0E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	--	--	na	5.3E+03
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor ^C	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	8.3E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	8.3E-04
Heptachlor Epoxide ^C	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	4.1E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	4.1E-04
Hexachlorobenzene ^C	0	--	--	na	2.9E-03	--	--	na	3.0E-03	--	--	--	--	--	--	--	--	--	--	na	3.0E-03
Hexachlorobutadiene ^C	0	--	--	na	1.8E+02	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
Hexachlorocyclohexane Alpha-BHC ^C	0	--	--	na	4.9E-02	--	--	na	5.1E-02	--	--	--	--	--	--	--	--	--	--	na	5.1E-02
Hexachlorocyclohexane Beta-BHC ^C	0	--	--	na	1.7E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Hexachlorocyclohexane Gamma-BHC ^C (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.9E+00	--	--	--	--	--	--	--	--	9.5E-01	--	na	1.9E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03
Hexachloroethane ^C	0	--	--	na	3.3E+01	--	--	na	3.5E+01	--	--	--	--	--	--	--	--	--	--	na	3.5E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene ^C	0	--	--	na	1.8E-01	--	--	na	1.9E-01	--	--	--	--	--	--	--	--	--	--	na	1.9E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone ^C	0	--	--	na	9.6E+03	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	7.3E+01	8.3E+00	na	--	7.3E+01	8.3E+00	na	--	--	--	--	--	--	--	--	--	7.3E+01	8.3E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	7.7E-01	--	--	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
Methylene Chloride ^C	0	--	--	na	5.9E+03	--	--	na	6.2E+03	--	--	--	--	--	--	--	--	--	--	na	6.2E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	1.3E+02	1.5E+01	na	4.6E+03	1.3E+02	1.5E+01	na	4.6E+03	--	--	--	--	--	--	--	--	1.3E+02	1.5E+01	na	4.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	6.9E+02	--	--	--	--	--	--	--	--	--	--	na	6.9E+02
N-Nitrosodimethylamine ^C	0	--	--	na	3.0E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
N-Nitrosodiphenylamine ^C	0	--	--	na	6.0E+01	--	--	na	6.3E+01	--	--	--	--	--	--	--	--	--	--	na	6.3E+01
N-Nitrosodi-n-propylamine ^C	0	--	--	na	5.1E+00	--	--	na	5.4E+00	--	--	--	--	--	--	--	--	--	--	na	5.4E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	--	--	--	--	--	--	--	--	2.8E+01	6.6E+00	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB Total ^C	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	6.7E-04	--	--	--	--	--	--	--	--	--	1.4E-02	na	6.7E-04
Pentachlorophenol ^C	0	3.9E+00	3.0E+00	na	3.0E+01	3.9E+00	3.0E+00	na	3.2E+01	--	--	--	--	--	--	--	--	3.9E+00	3.0E+00	na	3.2E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	8.6E+05	--	--	--	--	--	--	--	--	--	--	na	8.6E+05
Pyrene	0	--	--	na	4.0E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	4.2E+03	--	--	--	--	--	--	--	--	2.0E+01	5.0E+00	na	4.2E+03
Silver	0	1.8E+00	--	na	--	1.8E+00	--	na	--	--	--	--	--	--	--	--	--	1.8E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	4.2E+01	--	--	--	--	--	--	--	--	--	--	na	4.2E+01
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	3.5E+01	--	--	--	--	--	--	--	--	--	--	na	3.5E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	--	--	na	4.7E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	6.0E+03	--	--	--	--	--	--	--	--	--	--	na	6.0E+03
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	2.9E-03	--	--	--	--	--	--	--	--	7.3E-01	2.0E-04	na	2.9E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	--	--	--	--	--	--	--	--	4.6E-01	7.2E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	7.0E+01	--	--	--	--	--	--	--	--	--	--	na	7.0E+01
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	na	1.7E+02
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	2.5E+01	--	--	--	--	--	--	--	--	--	--	na	2.5E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	2.5E+01	--	--	--	--	--	--	--	--	--	--	na	2.5E+01
Zinc	0	8.5E+01	8.5E+01	na	2.6E+04	8.5E+01	8.5E+01	na	2.6E+04	--	--	--	--	--	--	--	--	8.5E+01	8.5E+01	na	2.6E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.4E+02
Arsenic	9.0E+01
Barium	na
Cadmium	5.0E-01
Chromium III	3.2E+01
Chromium VI	6.4E+00
Copper	3.7E+00
Iron	na
Lead	5.0E+00
Manganese	na
Mercury	4.6E-01
Nickel	8.8E+00
Selenium	3.0E+00
Silver	7.1E-01
Zinc	3.4E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Attachment J

Alex Barron's WER 2012 Memo, McKenney WER Study, 2013 permit modification request

From: Barron, Alex (DEQ)
Sent: Wednesday, May 30, 2012 8:55 AM
To: Cohen, Tamira (DEQ)
Subject: RE: McKenney WER approval
Attachments: McKenney WER Review final.docx -May 2012 final.docx

Hi Tamira:

Regarding the Water Effect Ratio (WER) for the McKenney Permit and EPA's approval; EPA and DEQ now agree that there is no requirement or need for EPA to provide any official "recommendation" or "approval" for WERs when the WER is applied as allowed for by Virginia's Water Quality Criteria for metals.

This means that we will not be getting any recommendation or approval from EPA for the McKenney WER study. We are ready to use the WER as approved in my review memo that found the WER to be scientifically justified and there is no need to wait for EPA's comments, as they will not be providing any.

This change came about because I discussed this issue with EPA Standards staff at the EPA-States meeting a couple of weeks ago.

I made the observation that Virginia has adopted water quality criteria for metals that include the allowance for a WER built into the formula, with the presumption that the WER is 1.0 unless a scientifically valid study establishes a different WER.

I pointed out that EPA has approved this form of the criteria, and that a WER is to be established using methods and procedures recommend by EPA.

In this way the use of the WER to modify the criterion value for a particular waterbody, or permit is analogous to the inclusion of the adjustment for hardness that is also contained in the criteria formulas. Since EPA does not approve the use of the waterbody-specific hardness in individual permits or other applications of the criteria, there is no real need for EPA to officially approve every individual WER either, as long as DEQ reviews and approves the study for the WER and certifies that it is scientifically sound. There are also some recommendations provided by EPA that support this line of reasoning.

After discussing this issue EPA has concluded that; given the way Virginia has adopted our metals criteria incorporating a WER into the criteria formulas, and as these are EPA-approved criteria, EPA has no official need to review and approve individual WER values and they will not be doing so in the future. As a courtesy, and to keep them informed of what we are doing, DEQ will continue to provide EPA with WER studies and all the review materials, but EPA will not be providing any specific recommendations, or approvals of WER values and they do not need to. I think both EPA and DEQ are satisfied with this position. It will make for quicker and simpler procedure for DEQ to follow in the future.

I have modified the last three paragraphs of my original review memo (new memo dated May 2012 attached) for the McKenney WER study to clarify this position, stating that EPA will not be issuing an approval or recommendation, and that the WER approved in the DEQ review memo is considered valid and acceptable for use in the permit.

In summary, from now on; Once DEQ has approved the WER, it is considered valid and may be used in the permit. EPA will not be providing any approval, or recommendation regarding a WER.

So the McKenney WER of 4.338 is “good to go” now.
Good luck and let me know if you need anything more.

DEPARTMENT OF ENVIRONMENTAL QUALITY

SUBJECT: Review of Town of McKenney, Virginia STP Water Effect Ratio Study (VPDES Permit # VA0060402)

By: Alex M. Barron

Date: May 2012

Summary Finding:

The Town of McKenney Virginia conducted a water effect ratio (WER) study following EPA's guidelines for a streamlined copper WER study under suitable conditions and resulted in establishing a **WER of 4.338** to be used in applying the Virginia water quality criteria to the specific discharge conditions at the sewage treatment plant (STP) site. The WER can be used to adjust the Virginia acute and chronic criteria for copper and calculate the resulting waste load allocations (WLA) for this permit and will be used to make permit decisions for the need for copper discharge limits for the McKenney STP, permit #VA0060402 which discharges into Great Creek, in the Chowan River System. Great Creek at the discharge site has a 1Q10 flow of 0.0 MGD.

Description of study and review:

The Town of McKenney is a small unincorporated town in Dinwiddie County Virginia with a population of 483 in the 2010 census. The Town of McKenney conducted a water effect ratio (WER) study for copper in order to establish a WER that can be applied to the Virginian copper criteria equations to calculate copper criteria that would apply to the discharge from their sewage treatment plant (STP).

Virginia's water quality criteria for copper in freshwater consists of formulas to adjust the acute or chronic criteria for hardness using formulas developed and recommended by the U.S Environmental Protection Agency (EPA). The Virginia criteria formulas include a water effect ratio (WER) which is set at a default value of 1.0 unless a WER study is performed for a specific receiving stream and discharge to establish a WER for that receiving stream. The Town of McKenney conducted the WER study in order to establish a WER applicable to their STP's receiving stream and to their discharge permit.

The Virginia freshwater criteria formulas for copper are shown below.

Freshwater acute criterion ($\mu\text{g/l}$) = $\text{WER} \times [e^{\{0.9422[\ln(\text{hardness})]-1.700\}}] \times (\text{CFa})$

Freshwater chronic criterion ($\mu\text{g/l}$) = $\text{WER} \times [e^{\{0.8545[\ln(\text{hardness})]-1.702\}}] \times (\text{CFc})$

WER = Water Effect Ratio =1 unless shown otherwise
under 9 VAC 25-260-140.F and listed in 9 VAC 25-260-310.

e = natural antilogarithm

ln=natural logarithm

CFa = 0.960

CFc = 0.960

McKenney WER Study:

The Town of McKenney conducted a water effect ratio (WER) study for copper in order to establish a WER that can be applied to the Virginian copper criteria equations to calculate copper criteria that would apply to the receiving stream and to their discharge permit. This study followed the EPA guidance for a Streamlined Water-Effect Ratio Procedure for Discharges of Copper EPA-822-R-01-05 (hereafter referred to as the streamlined WER guidance). This guidance document is available at: <http://epa.gov/waterscience/criteria/copper/2003/index.htm>.

This streamlined WER guidance requires two sets of side-by-side WER toxicity tests, conducted at different times at least a month apart and using a representative sample of the effluent and stream water mix at permit conditions. Each WER test consists of two side-by-side toxicity tests, where the test species *Ceriodaphnia dubia* is exposed to varying concentrations of added copper to establish an EC₅₀ value for copper. One of the tests is conducted in clean laboratory water and another test is conducted in simulated stream water consisting of receiving stream water and effluent mixed at the conditions of the permit. The two EC₅₀ values for these two toxicity tests are used to calculate a water effect ratio by dividing the EC₅₀ value from the test with the simulated stream-water by the EC₅₀ value from the lab-water test. It is expected that STP discharges and/or natural waters will contain elevated levels of carbon and other suspended solids, which will absorb some of the copper and make it less toxic as compared to clean lab water. This should result in less toxicity of copper in the natural water and the WER allows us to establish the amount of adjustment that can be made to the default criteria calculations and adjusts the criteria to the specific conditions at the permitted discharge.

A review of the streamlined water effect ratio (WER) study for the Town of McKenney STP indicates that the set of toxicity tests conducted on February-21-22, 2011 and March 31-April 1, 2011 were conducted under acceptable conditions and are suitable for establishing a WER for this permitted facility. In all tests, the testing laboratory measured the concentrations of copper in the toxicity tests and calculated EC₅₀ values using acceptable and established methods based on total copper measurements. This allowed for the calculation of a WER that is applicable to total copper measurements and which can be used directly for establishing Permit Limits for copper that are unique to this permit. In addition, the study also measured dissolved copper concentrations and a WER based on dissolved copper measurements can also be calculated, but the total copper WER is appropriate for use in translating the Virginia copper criteria into permit limits, which must be expressed as total metal concentrations.

In both sets of tests the EC₅₀ values for the lab-water tests were lower than the species mean acute value (SMAV) based on other EC₅₀ values reported in the literature for the test species *Ceriodaphnia dubia*. These literature values produced the dataset used to develop the freshwater copper criteria in the EPA criteria document and this is the default criteria used in Virginia unless a WER can be established for a specific discharge

the site. This is not unusual since more recent EC₅₀ values lab practices in conducting toxicity tests use very clean water that contain very little binding material, resulting in lower EC₅₀ values compared to tests in the past (which form the basis for the EPA and Virginia criteria) where lab waters often contained some carbon or other substances that lowered the toxicity of copper, resulting in higher EC₅₀ values. Under these circumstances (lab water EC₅₀ values lower than the SMAV), the Streamlined Water-Effect Ratio Procedure for Discharges of Copper specifies that instead of dividing the site-water EC₅₀ value by the lab-water EC₅₀ value, the SMAV must be used as the denominator in calculating the WER. This is done to keep the WER comparable to the established criteria values. Following the EPA's streamlined WER guidance (on page 13 and Appendix B page 17), the SMAV of 12.49 µg/L (at a hardness of 50 mg/L) as reported in the EPA streamlined WER guidance was used to establish the WER for this discharge and receiving stream. Before calculating the WERs, the SMAV values from the toxicity tests and SMAVs from the EPA streamlined WER guidance (Appendix B page 17) were normalized to the same reference hardness level of 50. The normalized EC₅₀ values were divided by the reference EC₅₀ value of 12.49 µg/L to produce the WER. The hardness normalization was done using the following formula as described in EPA's streamlined WER guidance (page 13);

EC₅₀ at standard hardness =

$$EC_{50 \text{ at sample hardness}} \times (\text{standard hardness} / \text{sample hardness})^{0.9422}$$

The consultant's report, in section 1, page 4 and section 2, page 14 presented the final WER values for total copper in Table 4. And table 17 respectively. The February tests produced a WER of 4.905 and the March 30 test produced a WER of 3.801.

The geometric mean of these two values is the **Final WER = 4.338**.

This is in keeping with other copper WERs established in other STP-effluent-dominated streams where WERs have ranged from 2.593 to 15.7.

This WER of 4.338 can be used to adjust the Virginia copper criteria for purposes of assessing the need for total recoverable copper permit limits for the McKenney, Virginia waste water treatment plant as it discharges into the Thornton River. This WER is unitless and is multiplied by Virginia copper criteria to adjust the criteria to account for the local water characteristics at the site of this permitted discharge. The permit specific copper criteria for this discharge become;

$$\text{Freshwater acute criterion } (\mu\text{g/l}) = 4.338 \times [e^{\{0.9422[\ln(\text{hardness})]-1.700\}}] \times 0.960$$

$$\text{Freshwater chronic criterion } (\mu\text{g/l}) = 4.338 \times [e^{\{0.8545[\ln(\text{hardness})]-1.702\}}] \times 0.960$$

The original EC₅₀ values from the two tests from July and August 2010, as well as the SMAV values after being normalized to the hardness level corresponding to the site-water toxicity test and the resulting WERs are shown in Table 1 attached below.

The WER can be used with any hardness that is considered appropriate for the McKenney STP effluent without any need for any adjustments. Once a WER is calculated based on a site-water EC_{50} value and SMAV concentration normalized to equal hardness levels, the WER value is the same regardless of the hardness used in calculating a criterion value. It is simply a unitless adjustment factor in the criterion equation.

DEQ Review and Approval of WER by DEQ:

The Virginia Department of Environmental Quality's Water Quality Standards Unit has reviewed this study and approves the use of a total copper WER of 4.338 to adjust the copper criteria as it applies to the Town of McKenney's STP permit and receiving stream Great Creek. This total copper WER of will be used to adjust the copper criteria and calculate the resulting waste load allocations (WLA) for this permit and will be used to make permit decisions for the need for copper discharge limits for the McKenney STP.

WER public participation and application in permits procedure:

The Virginia water Quality Standards (WQS) allow for a permittee to demonstrate that a WER is appropriate for their discharge and receiving stream. The WQS Regulation at 9VAC 25-260-140.F.4 states that the WER shall be subject to the public participation requirements of the Permit Regulation and described in the public notice of the permit proceedings. DEQ action to approve or disapprove a WER applicable to a permittee is a case decision rather than an amendment to the WQS. Decisions regarding WERs are subject to the public participation requirements of the Permit Regulation. In the past, the U.S. Environmental Protection Agency (EPA) technically viewed a WER as a site-specific criterion. However, because Virginia has incorporated the allowance for a WER in the Water Quality Standards regulation as part of the formula for the copper criteria, and because EPA has approved this form of the criteria, EPA does not have to (and will not) officially approve each individual WER, but they require that the public be given the opportunity to comment on the use of the WER in a permit.

As long as the WER is the established following EPA and DEQ recommended protocols (as is the case for the McKenney STP) and the study has been reviewed and approved by DEQ, the WER can be considered scientifically valid and can be used to apply the Virginia criteria for copper in an individual permit. DEQ will supply copies of the WER study and the review materials to EPA as a courtesy to keep them informed, but EPA does not have a need to officially approve individual WERs.

To satisfy the public participation requirements and give the public the opportunity to comment on the WER, the WER-modified copper criteria can be subjected to public participations via a permit related comment period, either via a permit re-issuance or permit modification.

In Summary, Final WER:

The final WER to be used to calculate total copper permit limits for the McKenney STP is the geometric mean of the two WER values 4.95 and $3.801 = 4.338$

Table 1;

Summary of all EC₅₀ values from the Town of McKenney STP WER studies; showing lab water values and SMAVs normalized to a standard hardness of 50.

Test Description		EC50 (total copper)		EC50 (total copper) (Normalized to 50 hardness)
February 2011; Lab water (hardness 87 mg/L)		16.13µg/L		9.572µg/L
February 2011; (100 hardness mg/L) simulated stream water test		118.8µg/L		61.83 µg/L
<i>Ceriodaphnia. dubia</i> SMAV at hardness 50 = 12.49 µg/L: (see EPA Cu-WER Guidance, page 17)			Total Cu <i>C. dubia</i> SMAV (Normalized to hardness 50 mg/L)	12.49 µg/L
March 30-April 1, 2011; Lab water (hardness = 84)		8.214µg/L		5.038 µg/L
March 30-April 1 2011; (hardness = 94) simulated stream water test		86.05µg/L		47.47µg/L
Species Mean Acute Value (SMAV) (see EPA Cu-WER Guidance, page 17)				
<i>Ceriodaphnia. dubia</i> SMAV at hardness 50 = 12.49 µg/L : (see EPA Cu-WER Guidance, page 17)			Total Cu <i>C. dubia</i> SMAV (Normalized to hardness 50 mg/L)	12.49 µg/L
WERs:		Total Cu WER		
February 2011 WER (using SMAV normalized to hardness @ 50 mg/L)	<u>61.83 µg/L</u> 12.49 µg/L	= 4.950		
March 30 – April 1, 2012 WER (using SMAV normalized to hardness @ 50 mg/L)	<u>47.47 µg/L</u> 12.49 µg/L	= 3.801		
		Final WER (total copper)		
<u>Final WER</u> (geometric mean of both WERs)		4.338		

Town of McKenney
Post Office Box 309
McKenney, Virginia 23872

Members of Council
Charles T. Mansfield, Mayor
Richard L. Hawthorne, Vice-Mayor
Kristen M. Beckwith
Virginia S. Howard
John Owen
J. Windell Tucker

Martha Stone, Clerk-Treasurer
E. Winfried Coleman, Town Sergeant
T.O. Rainey, III, Town Attorney

June 22, 2012

Ms. Tamira Cohen, Ph.D.
Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060

RECEIVED
JUN 25 2012
PRO

RE: Town of McKenney Permit Modification - VA0060402

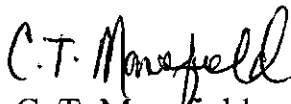
Dear Ms. Cohen:

Request modification to Town of McKenney Permit concerning WER.

Fee form with applicable funding has been forwarded to DEQ, Receipts Control,
PO Box 1104, Richmond, VA 23218

Thank you for your time and assistance.

Sincerely,


C. T. Mansfield
Mayor



B & B Consultants, Inc.

Engineers - Architects - Surveyors - Planners - Lab Analysts

P. O. Box 429 • 212 E. Ferrell Street
South Hill, Va. 23970
(434) 447-7621 • FAX: (434) 447-4257
email: bandb@bandbcons.com
www.bandbcons.com

May 11, 2011

Tamira Cohen, Ph.D.
Environmental Specialist II
Virginia Department of Environmental Quality
4949-A Cox Road
Glen Allen, Virginia 23060

Piedmont Regional Office

MAY 12 2011

RECEIVED


RE: VPDES Permit No. VA0060402
Town of McKenney

Dear Dr. Cohen:

As per our phone conversation this afternoon, enclosed are two (2) Water-Effect Ratio (WER) for Copper: Streamlined Method for the Town of McKenney's Sewage Treatment Plant. Please contact Mr. Bugg at hmbugg@bandbcons.com or 434-447-7621 if you have any questions regarding this report.

Very truly yours,

B & B CONSULTANTS, INC.


Mary C. Dickenson

:med

Enclosure (3)

WATER-EFFECT RATIO FOR COPPER: STREAMLINED METHOD

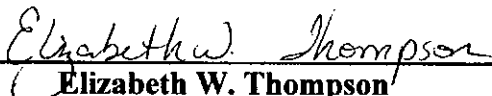
TOWN OF MCKENNEY, VIRGINIA: MCKENNEY SEWAGE TREATMENT PLANT

APRIL 2011

Piedmont Regional Office
MAY 12 2011
RECEIVED

REPORT SUBMITTED TO:
B & B Consultants, Inc.
South Hill, Virginia

REPORT SUBMITTED BY:


Elizabeth W. Thompson
Special Projects Manager

Shealy Consulting, LLC.
603 South Lake Drive
Lexington, SC 29072



WATER-EFFECT RATIO FOR COPPER: STREAMLINED METHOD

TOWN OF MCKENNEY, VIRGINIA: MCKENNEY SEWAGE TREATMENT PLANT

APRIL 2011

- Section 1: Summary Report
- Section 2: Full Text Report
- Section 3: Appendix A, Sampling data, toxicity test reports, and analytical reports for Study #1
- Section 4: Appendix B, Sampling data, toxicity test reports, and analytical reports for Study #2
- Section 5: Appendix C, Copper Control Chart

SECTION 1

SUMMARY REPORT

WATER-EFFECT RATIO FOR COPPER: STREAMLINED METHOD SUMMARY REPORT

TOWN OF MCKENNEY, VIRGINIA: MCKENNEY SEWAGE TREATMENT PLANT

APRIL 2011

This report summarizes the results of a copper Water-Effect Ratio study performed for the McKenney STP. The simulated stream samples used in this study consisted of 100% final effluent. A standard hardness of 50 mg/L was used to calculate WER values.

Streamlined WER for Copper Summary Report

1. General information

NPDES # VA0060402

Plant name: McKenney STP

Endpoint used in study (LC50, EC50, etc.): EC50

Stream 1Q10 flow = 0 MGD

Species used: *Ceriodaphnia dubia*

Form of copper used: $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$

Final WER: 4.338

Current limits on permit:

Measurement	Monthly Average	Weekly Average
Design flow (MGD)	0.10	0.10
Copper ($\mu\text{g/L}$)	9.3	9.3
BOD (mg/L)	25	38
Ammonia-Nitrogen (mg/L)	5.11	5.11
TSS (mg/L)	30	45

2. Chemical data (minimum 2 events, at least 4 weeks between each sampling)

Chemical data for sampling date: February 21 - February 22, 2011.

Parameter	LABWATER	Final Effluent
BOD		4.2 mg/L
Specific Conductance	310 µmhos/cm	486 µmhos/cm
TSS	<1.0 mg/L	3.8 mg/L
Alkalinity	63 mg/L	49 mg/L
TOC	1.2 mg/L	5.6 mg/L
DOC	1.8 mg/L	5.0 mg/L
Ammonia-N	<0.10 mg/L	0.33 mg/L
Hardness	87 mg/L	100 mg/L
Total Copper	<5.0 µg/L	29 µg/L
Dissolved Copper	<5.0 µg/L	21 µg/L

McKenney STP Flow during sample collection = 0.036 MGD

Chemical data for sampling date: March 28 - March 29, 2011.

Parameter	LABWATER	Final Effluent
BOD		15 mg/L
Specific Conductance	259 µmhos/cm	383 µmhos/cm
TSS	<1.0 mg/L	2.7 mg/L
Alkalinity	53 mg/L	52 mg/L
TOC	<1.0 mg/L	5.0 mg/L
DOC	3.2 mg/L	7.8 mg/L
Ammonia-N	<0.10 mg/L	0.38 mg/L
Hardness	84 mg/L	94 mg/L
Total Copper	<1.0 µg/L	13.0 µg/L
Dissolved Copper	<1.0 µg/L	10.0 µg/L

McKenney STP Flow during sample collection = 0.048 MGD

3. Test Results

Test results for sampling date: February 21 - February 22, 2011

Test	EC50 (µg/L Copper)		EC50 (µg/L Copper) Hardness normalized to 50 mg/L as CaCO ₃		WER* (EC50/SMAV)	
	total	dissolved	total	dissolved	total	dissolved
LABWATER	16.13	16.13	9.572	9.572		
SIMSTREAM	118.8	84.45	61.83	43.95	4.950	3.818

*-simulated stream water LC50/greater of lab water LC50 or SMAV
Total copper SMAV at 50 mg/L = 12.49
Dissolved copper SMAV at 50 mg/L = 11.51

Test results for sampling date: March 28 - March 29, 2011

Test	EC50 (µg/L Copper)		EC50 (µg/L Copper) Hardness normalized to 50 mg/L as CaCO ₃		WER (EC50/SMAV)	
	total	dissolved	total	dissolved	total	dissolved
LABWATER	8.214	7.444	5.038	4.566		
SIMSTREAM	86.05	76.02	47.47	41.94	3.801	3.644

*-simulated stream water LC50/greater of lab water LC50 or SMAV
Total copper SMAV at 50 mg/L = 12.49
Dissolved copper SMAV at 50 mg/L = 11.51

4. FWER calculation

List of WER's calculated at a hardness of 50 mg/L.

Study Date	Total Copper WER	Dissolved Copper WER
February 23, 2011	4.950	3.818
March 30, 2011	3.801	3.644

Final WER = $\left(\prod_{i=1}^n WER_i \right)^{1/n}$ Final WER is the geometric mean of all sample WERs, or the n th root of the product of the n sample WERs.

FWER= 4.338.

SECTION 2

FULL TEXT REPORT

WATER-EFFECT RATIO FOR COPPER: STREAMLINED METHOD SUMMARY REPORT

TOWN OF MCKENNEY, VIRGINIA: MCKENNEY SEWAGE TREATMENT PLANT

APRIL 2011

SECTION 1: Introduction

The Town of McKenney owns and operates the McKenney Sewage Treatment Plant at the Route 1010 Extension in McKenney, Virginia. The facility operates under NPDES permit #VA0060402, and discharges into Great Creek in the Chowan River Subbasin. The discharge permit includes a total copper limit of 9.3 µg/L, and concerns regarding compliance with this limit prompted the facility and their engineers to consider site-specific methods for copper limit development. At the request of the Town of McKenney and B & B Consultants, a copper water-effect ratio (WER) study was conducted for the McKenney STP by Shealy Consulting, LLC. Because the metal of concern was copper, the Streamlined Procedure for copper was implemented.

The studies used to develop the copper water-effect ratio for the McKenney STP adhered to EPA 823-B-94-001, *Interim Guidance on Determination and Use of Water-Effect Ratios for Metals*, and the Streamlined Method provided in EPA 822-R-01-005, *Streamlined Water-Effect Ratio Procedure for Discharges of Copper*. For detailed acute toxicity testing guidance, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, Fifth Edition, EPA 821-R-02-012, was referenced. The WER was determined using *Ceriodaphnia dubia*, a freshwater invertebrate in the family Cladocera.

The first study of the copper WER procedure was performed on February 23, 2011. Effluent was collected February 21-22, 2011. The WER's for *C. dubia* were 4.950 for total copper, and 3.818 for dissolved copper.

The second copper WER study was performed on March 30, 2011, using effluent collected March 28 – 29, 2011. The resulting WER values were 3.801 for total copper, and 3.644 for dissolved copper.

The final water-effect ratio (FWER) was determined as the geometric mean of the two total copper WER values. The copper FWER generated for the McKenney STP is 4.338.

Section 2: Water-Effect Ratio Study Conducted February 23-25, 2011

2.1 Sampling Information

On February 21, 2011, a composite sampler was set-up by personnel of the McKenney STP to collect final effluent. Teflon tubing was used in the compositors. To collect an equipment blank, de-ionized water was pumped through the compositing unit and preserved with nitric acid for total copper analysis. The compositor began sampling at 1300 on February 21, 2011, and completed the 24 hour collection period at 1300 on February 22, 2011. The effluent temperature in the collection jar was 8.3°C, and the effluent pH was 6.19 SU. The final effluent was put into 1 gallon containers with all air space removed. The TRC of the composited sample was 0.0 mg/L.

At 1300 on February 22, 2011, an effluent sample was filtered through a new disposable 0.45 micron Nalgene® filter unit. The filtered effluent sample was preserved with nitric acid for dissolved metals analysis. An unfiltered aliquot of effluent was preserved with nitric acid for total metals analysis. Prior to filtering the effluent, de-ionized water was pumped through the filter unit and preserved with nitric acid for dissolved copper analysis to confirm the absence of copper in the filtration equipment.

Samples were packed on ice for transport to the Shealy Consulting, LLC., in Lexington, South Carolina. A copy of the Chain-of-Custody form which accompanied the samples is available in Appendix A. The samples were received at Shealy Consulting, LLC. on February 23, 2011, at 1020. A receipt temperature of 1.2°C was documented. The samples were assigned the unique lot number A273, and were stored in a refrigeration unit set between 0 and 4°C. No air space was observed in the effluent sample containers prior to use in testing.

Weather conditions for 14 days prior to sample collection were obtained from monitoring reports provided by the National Weather Service. A summary of the weather conditions is provided in Appendix A. No measurable precipitation fell in the two weeks prior to the sampling event.

2.2 Sampling Conditions

McKenney STP personnel reported a plant effluent flow of 0.036 MGD for February 21 – 22, 2011. The BOD measured in the effluent was 4.2 mg/L, ammonia-N was 0.33 mg/L, and TSS was 3.8 mg/L. All of these parameters were less than the permitted discharge limits, indicating that the STP was operating normally during the sampling event (see Table 1).

The stream flow of the Nottoway River near Rawlings, VA (USGS#2044500) was reported to be 75 ft³/s. This gauge site was used to correlate the flows of Great Creek in the facility's permit. The average annual flow from 2006-2010 is approximately 253 ft³/s. The flow of the Nottoway River was not above the average flow during sampling, which indicates that the rivers in the vicinity, including Great Creek, were flowing normally and were not impacted by weather events.

Table 1: Town of McKenney STP Permit Limits

Measurement	Effluent Collected February 21-22, 2011	Permitted Monthly Average	Permitted Weekly Average
STP Flow (MGD)	0.036	0.10	0.10
BOD (mg/L)	4.2	25	38
Ammonia-Nitrogen (mg/L)	0.33	5.11	5.11
TSS (mg/L)	3.8	30	45

2.3 Copper Source for Study #1

The copper source for Study #1 was cupric sulfate pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) obtained from Fisher Scientific. The container of cupric sulfate was designated as SHEALY # T10-060 (expires 08/24/12). A primary copper stock was prepared on February 22, 2011, by adding 1.00078 g cupric sulfate pentahydrate to 1 liter de-ionized water in a volumetric flask.

2.4 LABWATER Test Dilutions for Study #1

Laboratory dilution water was prepared on February 15, 2011, and was designated EPA-052. To prepare the dilution water, Town of Lexington drinking water was treated with mixed-bed de-ionizers, UV filtration, an ultra-filtration polishing unit, and a bacterial filter to produce Type 1 de-ionized water. Dilution water was prepared by adding reagents to the de-ionized water according to the procedure for obtaining moderately hard synthetic dilution water found in Section 7 of EPA 82-R-02-012, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*. This procedure produces water with hardness in the range of 80-100 mg/L as CaCO_3 .

A LABWATER sub-stock of cupric sulfate was prepared on February 23, 2011, by diluting 2 ml of the primary copper stock to 500 ml with EPA-052. This provided a sub-stock with a nominal copper concentration of 1 mg/L. The test dilutions were prepared by combining the LABWATER sub-stock with un-spiked EPA-052 to obtain the following nominal copper concentrations: 2.5, 3.9, 6.0, 9.1, 14, and 21 $\mu\text{g/L}$. Acid washed Class 'A' pipettes and cylinders were used to prepare sub-stocks and dilutions.

Table 2: Preparation of LABWATER test dilutions for the McKenney STP WER study conducted February 23-25, 2011.

Treatment (% LABWATER Sub-stock)	Nominal Copper Concentration ($\mu\text{g/L}$)	LABWATER Sub-stock Used (ml)	Dilution
Lab. Control	0	0	To 600 ml with EPA-052
0.25	2.5	1.5	To 600 ml with EPA-052
0.39	3.9	2.3	To 600 ml with EPA-052
0.60	6.0	3.6	To 600 ml with EPA-052
0.91	9.1	5.5	To 600 ml with EPA-052
1.4	14	8.4	To 600 ml with EPA-052
2.1	21	12.6	To 600 ml with EPA-052

All dilutions were prepared by 1120 on February 23, 2011. A 200 ml aliquot of each dilution was preserved with nitric acid for total copper analysis. A separate 200 ml aliquot of each dilution was filtered at 0.45 μ m and preserved with nitric acid for dissolved copper analysis. The remaining solution was used for toxicity testing.

2.5 SIMSTREAM Test Dilutions for Study #1

The Streamlined Procedure dictates that Simulated Stream water (SIMSTREAM) must be constructed by combining McKenney STP final effluent and upstream receiving stream water at the design low-flow conditions (Instream Waste Concentration, or IWC). The IQ10 of the receiving stream is 0 MGD, so the SIMSTREAM water consisted of 100% effluent. The hardness of the SIMSTREAM was measured via hand-titration as 110 mg/L prior to use in testing, but an additional aliquot of the SIMSTREAM was submitted for hardness confirmation at the Shealy Environmental Services analytical laboratory. The hardness value reported by the SHEALY analytical laboratory of 100 mg/L was used to normalize the test results prior to the calculation of WER values. Aliquots of LABWATER and McKenney STP effluent were submitted for chemical characterization (see Section 2.6).

A SIMSTREAM sub-stock of cupric sulfate was prepared by diluting 4 ml of the primary copper stock to 1000 ml with SIMSTREAM. This provided a sub-stock with a nominal copper concentration of 1.0 mg/L. The test dilutions were prepared by combining the SIMSTREAM sub-stock with un-spiked SIMSTREAM to obtain the following nominal copper concentrations: 32, 49, 75, 116, 179, 275, and 423 μ g/L. Acid washed Class 'A' pipettes and cylinders were used to prepare sub-stocks and dilutions.

Table 3: Preparation of SIMSTREAM test dilutions for the McKenney STP WER study conducted February 23-25, 2011.

Treatment (% SIMSTREAM Sub-stock)	Nominal Copper Concentration (μ g/L)	SIMSTREAM Sub-stock Used (ml)	Dilution
Lab. Control	0	0	EPA-052
SIMSTREAM	0	0	SIMSTREAM
3.2	32	19.2	To 600 ml with SIMSTREAM
4.9	49	29.4	To 600 ml with SIMSTREAM
7.5	75	45	To 600 ml with SIMSTREAM
11.6	116	70	To 600 ml with SIMSTREAM
17.9	179	107	To 600 ml with SIMSTREAM
27.5	275	165	To 600 ml with SIMSTREAM
42.3	423	254	To 600 ml with SIMSTREAM

SIMSTREAM test dilutions were prepared by 1145 on February 23, 2011. A 200 ml aliquot of each dilution was preserved with nitric acid for total copper analysis. A separate 200 ml aliquot was filtered at 0.45 μ m and preserved with nitric acid for dissolved copper analysis. The remaining solution was used for toxicity testing.

2.6 Analytical Profile of Test Waters

Table 4: Analytical measurements for laboratory dilution water and effluent submitted February 23, 2011. Full analytical reports including complete metal scans are available in Appendix A.

Parameter	LABWATER	Final Effluent
BOD		4.2 mg/L
Specific Conductance	310 μ mhos/cm	486 μ mhos/cm
TSS	<1.0 mg/L	3.8 mg/L
Alkalinity	63 mg/L	49 mg/L
TOC	1.2 mg/L	5.6 mg/L
DOC	1.8 mg/L	5.0 mg/L
Ammonia-N	<0.10 mg/L	0.33 mg/L
Hardness	87 mg/L	100 mg/L
Total Copper	<5.0 μ g/L	29 μ g/L
Dissolved Copper	<5.0 μ g/L	21 μ g/L

2.7 Toxicity Test Results for Study #1

Test solutions were allowed to equilibrate at least 2 hours prior to test initiation. Each test treatment consisted of 4 test chambers with 5 *C. dubia* each, and one surrogate test chamber with 5 organisms to be used for water chemistry measurements only (D.O., pH, and temperature). The test chambers for the LABWATER test, the SIMSTREAM test, and all surrogates were filled with test solution and randomized on a single test board. The test organisms were introduced into chambers by rows without de-randomizing the chambers. Test organisms were introduced into test solutions at 1500 on February 23, 2011. Test organisms were from the brood designated SC261, and were born from 0830 – 1300 on February 23, 2011. Test organisms were fed two hours prior to the initiation of the test, but food was not introduced into actual test solutions. Dissolved oxygen, pH, and temperature were measured for each test concentration at test initiation. The test board was placed in Incubator #2 set for a temperature of $25 \pm 1^\circ\text{C}$ and a cycle of 16 hours light and 8 hours dark.

At 24 hours, the test board was removed from the incubator. D.O., pH, and temperature were measured in the surrogate chambers for each test concentration. Mortality was recorded, and the test board placed back into the incubator.

The toxicity tests were terminated on February 25, 2011, at 1430. Immediately after mortality was recorded, appropriate test solutions were filtered at 0.45 microns and preserved with nitric acid for dissolved copper analysis. The solutions submitted for dissolved copper analysis were all controls, the highest LABWATER and SIMSTREAM test concentrations at which there was no mortality, all test concentrations having partial mortality, and the lowest LABWATER and SIMSTREAM test concentrations having complete mortality. Dissolved oxygen, pH, and temperature were measured for each test concentration at test termination.

Test reports for the LABWATER and both SIMSTREAM tests are available in Appendix A. All water chemistry parameters were within the expected ranges. Temperature remained within $25 \pm 1^\circ\text{C}$, and D.O. remained above the required 6.0 mg/L. Survival was 100% in the laboratory dilution water controls and un-spiked SIMSTREAM treatment. Table 5 provides a summary of temperature and

D.O. measurements taken during the tests. Table 6 provides a summary of the LABWATER test data, and Table 7 provides a summary of the SIMSTREAM test data.

Table 5: Summary of temperature and dissolved oxygen measurements taken during the *C. dubia* tests for the McKenney STP WER study of February 23-25, 2011.

Test	Temperature Range (°C)	Average Temperature (°C)	D.O. Range (mg/L)	Average D.O. (mg/L)
LABWATER	24.5 – 26.0	25.3	7.97 – 8.18	8.05
SIMSTREAM	24.3 – 26.0	25.1	7.76 – 8.15	7.97

Table 6: Summary of toxicity test results and actual metal measurements for the McKenney STP LABWATER test with *C. dubia* conducted February 23-25, 2011.

Treatment (% LABWATER Sub-stock)	Initial Concentration Copper Total / Dissolved (µg/L)	Final Concentration Copper Dissolved (µg/L)	Mortality at 48 Hours
Lab Control	<1.0 / <1.0	<1.0	0%
0.25	2.3 / 2.1	*	0%
0.39	3.9 / 3.7	*	0%
0.60	5.5 / 5.2	*	0%
0.91	8.6 / 8.5	*	0%
1.4	13 / 13	9.1	0%
2.1	20 / 20	15	100%

* Analysis of final dissolved copper is not required for this test concentration.

Table 7: Summary of toxicity test results and actual metal measurements for the McKenney STP SIMSTREAM test with *C. dubia* conducted February 23-25, 2011.

Treatment (% SIMSTREAM Sub-stock)	Initial Concentration Copper Total / Dissolved (µg/L)	Final Concentration Copper Dissolved (µg/L)	Mortality at 48 Hours
Lab Control	<1.0 / <1.0	<1.0	0%
SIMSTREAM	26 / 20	20	0%
3.2	56 / 44	*	0%
4.9	78 / 60	52	0%
7.5	110 / 77	71	15%
11.6	140 / 100	95	100%
17.9	200 / 150	*	100%
27.5	310 / 220	*	100%
42.3	450 / 320	*	100%

* Analysis of final dissolved copper is not required for this test concentration.

2.8 Final Copper WER Calculation for Study #1

EC50's were determined using measured total and dissolved copper values for test concentrations. One of the tests did not have two or more concentrations with partial mortality, so the Spearman- Karber Method (TOXCALC v5.0.23) was used to determine 48-hour EC50 values for the LABWATER and SIMSTREAM tests. A standard hardness of 50 mg/L was used to normalize all EC50 data prior to the calculation of WER values.

The EC50 for total copper in the LABWATER test was 16.13 µg/L. The EC50 was normalized from the reported hardness of 87 mg/L to a standard hardness of 50 mg/L using the published slope for copper of 0.9422, (EPA 2002). The normalized value became 9.57 µg/L total copper. The EC50 value for dissolved copper was 16.13 µg/L, and was normalized to 9.57 µg/L.

The EC50 for total copper in the SIMSTREAM test was 118.8 µg/L. The EC50 was normalized from the reported hardness of 100 mg/L to a standard hardness of 50 mg/L using the published slope for copper of 0.9422, (EPA 2002). The normalized value became 61.83 µg/L total copper. The EC50 value for dissolved copper was 84.45 µg/L, and was normalized to 43.95 µg/L.

The Streamlined Procedure requires that the WER be calculated by dividing the SIMSTREAM LC50 by the greater of either the LABWATER LC50 or the published SMAV (species mean acute value). For *C. dubia*, the SMAV for total copper at a hardness of 50 mg/L is 12.49 µg/L, (EPA 2001). The SMAV for dissolved copper at a hardness of 50 mg/L is 11.51 µg/L (EPA 2001). Since the published SMAV values are greater than the values derived from this study, they were used to calculate the total and dissolved WER values. The total copper WER value for the study conducted February 23, 2011, with *C. dubia*, was 4.950. The dissolved copper WER for the study was 3.818. Table 8 provides a summary of the results.

Table 8: LABWATER and SIMSTREAM copper EC50 values, the associated normalized values, and the calculated copper WER values for the McKenney STP study conducted February 23-25, 2011, with *Ceriodaphnia dubia*.

Test	EC50 (µg/L Copper)		EC50 (µg/L Copper) Hardness normalized to 50 mg/L as CaCO ₃		WER (EC50/SMAV)	
	total	dissolved	total	dissolved	total	dissolved
LABWATER	16.13	16.13	9.572	9.572		
SIMSTREAM	118.8	84.45	61.83	43.95	4.950	3.818

Section 3: Water-Effect Ratio Study Conducted March 30 - April 1, 2011

3.1 Sampling Information

On March 28, 2011, a composite sampler was set-up by personnel of the McKenney STP to collect final effluent. Teflon tubing was used in the compositors. To collect an equipment blank, de-ionized laboratory water was pumped through the compositing unit and preserved with nitric acid for total copper analysis. The compositor began sampling at 1250 on March 28, 2011, and completed the 24 hour collection period at 1250 on March 29, 2011. The effluent temperature in the collection jar was 8.8°C, and the effluent pH was 6.83 SU. The final effluent was put into 1 gallon containers with all air space removed. The TRC of the composited sample was 0.0 mg/L.

At 1250 on March 29, 2011, an effluent sample was filtered through a new disposable 0.45 micron Nalgene® filter unit. The filtered effluent sample was preserved with nitric acid for dissolved metals analysis. An unfiltered aliquot of effluent was preserved with nitric acid for total metals analysis. Prior to filtering the effluent, de-ionized water was pumped through the filter unit and preserved with nitric acid for dissolved copper analysis to confirm the absence of copper in the filtration equipment.

Samples were packed on ice for transport to the Shealy Consulting, LLC., in Lexington, South Carolina. A copy of the Chain-of-Custody form which accompanied the samples is available in Appendix B. The samples were received at Shealy Consulting, LLC. on March 30, 2011, at 1000. A receipt temperature of 0.2°C was documented. The samples were assigned the unique lot number A398, and were stored in a refrigeration unit set between 0 and 4°C. No air space was observed in the effluent sample containers prior to use in testing.

Weather conditions for 14 days prior to sample collection were obtained from monitoring reports provided by the National Weather Service. A summary of the weather conditions is provided in Appendix B. The most recent rain event was on March 27, 2011, with only 0.03 inches of rain measured.

3.2 Sampling Conditions

McKenney STP personnel reported a plant effluent flow of 0.048 MGD for March 28-29, 2011. The BOD measured in the effluent was 15 mg/L, ammonia-N was 0.38 mg/L, and TSS was 2.7 mg/L. All of these parameters were less than the permitted discharge limits, indicating that the STP was operating normally during the sampling event (see Table 9).

The stream flow of the Nottoway River near Rawlings, VA (USGS#2044500) was reported to be 164 ft³/s. This gage site was used to correlate the flows of Great Creek in the facility's permit. The average annual flow from 2006-2010 is approximately 253 ft³/s. The flow of the Nottoway River was not above the average flow during sampling, which indicates that the rivers in the vicinity, including Great Creek, were flowing normally and were not impacted by weather events.

Table 9: Town of McKenney STP Permit Limits

Measurement	Effluent Collected March 28-29, 2011	Permitted Monthly Average	Permitted Weekly Average
STP Flow (MGD)	0.048	0.10	0.10
BOD (mg/L)	15	25	38
Ammonia-Nitrogen (mg/L)	0.38	5.11	5.11
TSS (mg/L)	2.7	30	45

3.3 Copper Source for Study #2

The copper source for Study #2 was cupric sulfate pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) obtained from Fisher Scientific. The container of cupric sulfate was designated as SHEALY T10-060 (expires 08/24/12). A primary copper stock was prepared on March 30, 2011, by adding 1.00038 g cupric sulfate pentahydrate to 1 liter de-ionized water in a volumetric flask.

3.4 LABWATER Test Dilutions for Study #2

Laboratory dilution water was prepared on March 22, 2011, and was designated EPA-061. To prepare the dilution water, Town of Lexington drinking water was treated with mixed-bed de-ionizers, UV filtration, an ultra-filtration polishing unit, and a bacterial filter to produce Type I de-ionized water. Dilution water was prepared by adding reagents to the de-ionized water according to the procedure for obtaining moderately hard synthetic dilution water found in Section 7 of EPA 82-R-02-012, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*. This procedure produces water with hardness in the range of 80-100 mg/L as CaCO_3 .

A LABWATER sub-stock of cupric sulfate was prepared on March 30, 2011, by diluting 2 ml of the primary copper stock to 500 ml with EPA-061. This provided a sub-stock with a nominal copper concentration of 1 mg/L. The test dilutions were prepared by combining the LABWATER sub-stock with un-spiked EPA-061 to obtain the following nominal copper concentrations: 2.5, 3.9, 6.0, 9.1, 14, and 21 $\mu\text{g/L}$. Acid washed Class 'A' pipettes and cylinders were used to prepare sub-stocks and dilutions.

Table 10: Preparation of LABWATER test dilutions for the McKenney STP WER study conducted March 30 - April 1, 2011.

Treatment (% LABWATER Sub-stock)	Nominal Copper Concentration ($\mu\text{g/L}$)	LABWATER Sub-stock Used (ml)	Dilution
Lab. Control	0	0	To 600 ml with EPA 061
0.25	2.5	1.5	To 600 ml with EPA 061
0.39	3.9	2.3	To 600 ml with EPA 061
0.60	6.0	3.6	To 600 ml with EPA 061
0.91	9.1	5.5	To 600 ml with EPA 061
1.4	14	8.4	To 600 ml with EPA 061
2.1	21	12.6	To 600 ml with EPA 061

Labwater test dilutions were prepared by 1100 on March 30, 2011. A 200 ml aliquot of each dilution was preserved with nitric acid for total copper analysis. A separate 200 ml aliquot was filtered at 0.45 μm

using a new Nalgene® analytical filter unit and preserved with nitric acid for dissolved copper analysis. The remaining solution was used for toxicity testing.

3.5 SIMSTREAM Test Dilutions for Study #2

The Streamlined Procedure dictates that Simulated Stream water (SIMSTREAM) must be constructed by combining McKenney STP final effluent and upstream receiving stream water at the design low-flow conditions (Instream Waste Concentration, or IWC). The 1Q10 of the receiving stream is 0 MGD, so the SIMSTREAM water consisted of 100% effluent. The hardness of the SIMSTREAM was measured via hand-titration as 94 mg/L prior to use in testing, but an additional aliquot of the SIMSTREAM was submitted for hardness confirmation at the Shealy Environmental Services analytical laboratory. The hardness value reported by the SHEALY analytical laboratory of 94 mg/L was used to normalize the test results prior to the calculation of WER values. Aliquots of LABWATER and McKenney STP effluent were submitted for chemical characterization (see Section 3.6).

A SIMSTREAM sub-stock of cupric sulfate was prepared by diluting 2 ml of the primary copper stock to 500 ml with SIMSTREAM. This provided a sub-stock with a nominal copper concentration of 1.0 mg/L. The test dilutions were prepared by combining the SIMSTREAM sub-stock with un-spiked SIMSTREAM to obtain the following nominal copper concentrations: 21, 32, 49, 75, 116, 179, and 275 µg/L. Acid washed Class 'A' pipettes and cylinders were used to prepare sub-stocks and dilutions.

Table 11: Preparation of SIMSTREAM test dilutions for the McKenney STP WER study conducted March 30 - April 1, 2011.

Treatment (% SIMSTREAM Sub-stock)	Nominal Copper Concentration (µg/L)	SIMSTREAM Sub-stock Used (ml)	Dilution
Lab. Control	0	0	EPA 061
SIMSTREAM	0	0	SIMSTREAM
2.1	21	12.6	To 600 ml with SIMSTREAM
3.2	32	19.2	To 600 ml with SIMSTREAM
4.9	49	29.4	To 600 ml with SIMSTREAM
7.5	75	45	To 600 ml with SIMSTREAM
11.6	116	69.6	To 600 ml with SIMSTREAM
17.9	179	107.4	To 600 ml with SIMSTREAM
27.5	275	165	To 600 ml with SIMSTREAM

SIMSTREAM test dilutions were prepared by 1120 on March 30, 2011. A 200 ml aliquot of each dilution was preserved with nitric acid for total copper analysis. A separate 200 ml aliquot was filtered at 0.45 µm using a new Nalgene® analytical filter unit and preserved with nitric acid for dissolved copper analysis. The remaining solution was used for toxicity testing.

3.6 Analytical Profile of Test Waters

Table 12: Analytical measurements for laboratory dilution water and effluent submitted March 30, 2011. Full analytical reports including complete metal scans are available in Appendix B.

Parameter	LABWATER	Final Effluent
BOD		15 mg/L
Specific Conductance	259 μ mhos/cm	383 μ mhos/cm
TSS	<1.0 mg/L	2.7 mg/L
Alkalinity	53 mg/L	52 mg/L
TOC	<1.0 mg/L	5.0 mg/L
DOC	3.2 mg/L	7.8 mg/L
Ammonia-N	<0.10 mg/L	0.38 mg/L
Hardness	84 mg/L	94 mg/L
Total Copper	<1.0 μ g/L	13.0 μ g/L
Dissolved Copper	<1.0 μ g/L	10.0 μ g/L

3.7 Toxicity Test Results for Study #2

Test solutions were allowed to equilibrate at least 2 hours prior to test initiation. Each test treatment consisted of 4 test chambers with 5 *C. dubia* each, and one surrogate test chamber with 5 organisms to be used for water chemistry measurements only (D.O., pH, and temperature). The test chambers for the LABWATER test, the SIMSTREAM test, and all surrogates were filled with test solution and randomized on a single test board. The test organisms were introduced into chambers by rows without de-randomizing the chambers. Test organisms were introduced into test solutions at 1400 on March 30, 2011. Test organisms were from the brood designated SC299, and were born between 1600 on March 29, and 1005 on March 30, 2011. Test organisms were fed two hours prior to the initiation of the test, but food was not introduced into actual test solutions. Dissolved oxygen, pH, and temperature were measured for each test concentration at test initiation. The test board was placed in Incubator #2 set for a temperature of $25 \pm 1^\circ\text{C}$ and a 16 hour light/8 hour dark cycle.

At 24 hours, the test board was removed from the incubator. D.O., pH, and temperature were recorded in the surrogate chambers for each test concentration. Mortality was recorded, and the test board placed back into the incubator.

The toxicity tests were terminated at 1400 on April 1, 2011. Immediately after mortality was recorded, appropriate test solutions were filtered at 0.45 microns and preserved with nitric acid for dissolved copper analysis. Pre-packaged Nalgene® analytical filter units were used to filter the solutions. The test solutions submitted included all controls, the highest LABWATER and SIMSTREAM test concentrations at which there was no mortality, all test concentrations having partial mortality, and the lowest LABWATER and SIMSTREAM test concentrations having complete mortality. Dissolved oxygen, pH, and temperature were measured for each test concentration at test termination.

Test reports for the LABWATER and both SIMSTREAM tests are available in Appendix B. All water chemistry parameters were within the expected ranges. Temperature remained within $25 \pm 1^\circ\text{C}$, and D.O. remained above the required 6.0 mg/L. Survival was >90% in the laboratory dilution water controls and un-spiked SIMSTREAM treatment. Table 13 provides a summary of temperature and D.O.

measurements taken during the tests. Table 14 provides a summary of the LABWATER test data, and Table 15 provides a summary of the SIMSTREAM test data.

Table 13: Summary of temperature and dissolved oxygen measurements taken during the *C. dubia* tests for the McKenney STP WER study March 30 - April 1, 2011.

Test	Temperature Range (°C)	Average Temperature (°C)	D.O. Range (mg/L)	Average D.O. (mg/L)
LABWATER	24.1 – 26.0	25.0	7.77 – 8.55	8.18
SIMSTREAM	24.0 – 25.8	24.9	7.68 – 8.58	8.16

Table 14: Summary of toxicity test results and actual metal measurements for the McKenney STP LABWATER test with *C. dubia* conducted March 30 - April 1, 2011.

Treatment (% LABWATER Sub-stock)	Initial Concentration Copper Total / Dissolved (µg/L)	Final Concentration Copper Dissolved (µg/L)	Mortality at 48 Hours
Lab Control	<1.0 / <1.0	<1.0	5%
0.25	2.5 / 2.4	*	0%
0.39	3.8 / 3.6	2.9	0%
0.60	6.6 / 6.1	5.0	15%
0.91	9.4 / 8.4	7.3	75%
1.4	14 / 13	11	100%
2.1	19 / 20	*	100%

* Analysis of final dissolved copper is not required for this test concentration.

Table 15: Summary of toxicity test results and actual metal measurements for the McKenney STP SIMSTREAM test with *C. dubia* conducted March 30 - April 1, 2011.

Treatment (% SIMTREAM Sub-stock)	Initial Concentration Copper Total / Dissolved (µg/L)	Final Concentration Copper Dissolved (µg/L)	Mortality at 48 Hours
Lab Control	<1.0 / <1.0	<1.0	10%
SIMSTREAM	18 / 18	14	0%
2.1	35 / 27	*	0%
3.2	48 / 46	40	0%
4.9	66 / 58	51	5%
7.5	94 / 83	77	70%
11.6	130 / 120	110	100%
17.9	190 / 160	*	100%
27.5	280 / 250	*	100%

* Analysis of final dissolved copper is not required for this test concentration.

3.8 Final Copper WER Calculation for Study #2

EC50's were determined using measured total and dissolved copper values as test concentrations. The Probit Method was used (TOXCALC v5.0.23) to determine 48-hour EC50 values for the LABWATER and SIMSTREAM tests. A standard hardness of 50 mg/L was used to normalize the EC50 data prior to the calculation of WER values.

The EC50 for total copper in the LABWATER test was 8.214 µg/L. The EC50 was normalized from the reported hardness of 84 mg/L to a standard hardness of 50 mg/L using the published slope for copper of 0.9422, (EPA 2002). The normalized value became 5.038 µg/L total copper. The EC50 value for dissolved copper was 7.444 µg/L, and was normalized to 4.566 µg/L.

The EC50 for total copper in the SIMSTREAM test was 86.05 µg/L. The EC50 was normalized from the reported hardness of 94 mg/L to a standard hardness of 50 mg/L using the published slope for copper of 0.9422, (EPA 2002). The normalized value became 47.47 µg/L total copper. The EC50 value for dissolved copper was 76.02 µg/L, and was normalized to 41.94 µg/L.

The Streamlined Procedure requires that the WER be calculated by dividing the SIMSTREAM LC50 by the greater of either the LABWATER LC50 or the published SMAV (species mean acute value). For *C. dubia*, the SMAV for total copper at a hardness of 50 mg/L is 12.49 µg/L, (EPA 2001). The SMAV for dissolved copper at a hardness of 50 mg/L is 11.51 µg/L (EPA 2001). Since the published SMAV values are greater than the values derived from this study, they were used to calculate the total and dissolved WER values. The total copper WER value for the study conducted March 30 - April 1, 2011, with *C. dubia*, was 3.801. The dissolved copper WER for the study was 3.644. Table 16 provides a summary of these results.

Table 16: LABWATER and SIMSTREAM copper EC50 values, the associated normalized values, and the calculated copper WER values for the McKenney STP study conducted March 30 - April 1, 2011.

Test	EC50 (µg/L Copper)		EC50 (µg/L Copper) Hardness normalized to 50 mg/L as CaCO ₃		WER (EC50/SMAV)	
	total	dissolved	total	dissolved	total	dissolved
LABWATER	8.214	7.444	5.038	4.566		
SIMSTREAM	86.05	76.02	47.47	41.94	3.801	3.644

Section 4: FWER Determination for Copper

Table 17: Copper WER values generated for the McKenney STP:

Study Date	Total Copper WER	Dissolved Copper WER
February 23, 2011	4.950	3.818
March 30, 2011	3.801	3.644

The Final WER (FWER) is calculated as the geometric mean of all total copper WERs. The geometric mean of the two total WER values is **4.338**.

Section 5: Test Result Comparison

Table 18: Values published in EPA 2001 for copper toxicity to *Ceriodaphnia dubia*. The values listed were generated with *C. dubia* <24 hours old, at static conditions, and using measured copper values.

REFERENCE	HARDNESS USED IN STUDY (MG/L)	EC50 (UG/L)	EC50 NORMALIZED TO HARDNESS OF 25 MG/L
Diamond, W.F. 2000.	78	13.1	4.48
	90	8.88	2.66
	90	10.3	3.08
Tetra Tech. 1998	99	10.1	2.76
	70	14.65	5.55
	74	6.72	2.42
	72	6.59	2.43
Diamond et al. 1997b.	80	6.98	2.33
Neserke, G. 1994.	87.5	11.25	3.46
	80.8	13.17	4.36
	80.8	25.25	8.36
	60	11.25	4.93
	30	4.5	3.79

The values listed in EPA 2001 were included in this summary only if they were generated using three criteria: 1) the *C. dubia* tested were less than 24 hours old, 2) the test was conducted under static conditions, and 3) measured copper values were used to determine EC50s. Using the hardness-normalized values, the average total copper EC50 for the EPA values is 3.89 µg/L. The upper limit using 2 standard deviations is 7.29 µg/L, and the lower limit is 0.49 µg/L.

A copy of the Shealy toxicity laboratory reference control chart for copper is included as Appendix C. The control chart includes all copper studies in LABWATER from July 18, 2007, through September 15, 2010. The control chart mean is 2.2017 µg/L, with an upper limit of 3.154 µg/L and a lower limit of 1.249 µg/L.

Table 19 provides the *C.dubia* EC50 data from both McKenney STP WER studies, the EPA published copper EC50 values, and Shealy Consulting, LLC., copper EC50 data.

Table 19: Comparison of EC50 values generated for *C. dubia* <24 hours old. All studies referenced were generated under static conditions with EC50 values calculated using measured total copper. All EC50 values are normalized to a hardness of 25 mg/L.

Study/Facility	Mean EC50 Value (µg/L)	Range (2SD) (µg/L)
Shealy Consulting, LLC.	2.2017	1.249 – 3.154
Values Published in EPA 2001	3.893	0.49-7.29
McKenney WER Study #1	2.402	
McKenney WER Study #2	2.261	

Section 6: Blank Analysis Results

Blanks were collected for copper analysis at various points during the WER studies. All analytical reports for the blanks are in the appendix associated with each study.

For Study#1, the field blank, equipment blanks, filtration blanks, and all laboratory equipment/glassware blanks resulted in copper values of $< 1 \mu\text{g/L}$ copper.

For Study#2, the field blank, equipment blanks, filtration blanks, and all laboratory equipment/glassware blanks resulted in copper values of $< 1 \mu\text{g/L}$ copper.

Section 7: References

- APHA (2005) Standard Methods for the Examination of Water and Wastewater. 21st Edition. Prepared and published jointly by: APHA, AWWA, and WEF.
- US Environmental Protection Agency* (1994). Interim Guidance on Determination and Use of Water-Effect Ratios for Metals. EPA 823-B-94-001. Office of Water, Washington, D.C.
- US Environmental Protection Agency* (1995). 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA 820-B-96-001. Office of Water, Washington, D.C.
- US Environmental Protection Agency* (2001). Streamlined Water-Effect Ratio Procedure for Discharges of Copper. EPA-822-R-01-005. Office of Water, Washington, D.C.
- US Environmental Protection Agency* (2002). Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition EPA 821-R-02-012. Environmental Research Laboratory, Duluth, MN.
- US Environmental Protection Agency* (2002). National Recommended Water Quality Criteria: 2002. EPA-822-R-02-047 November 2002. Office of Water, Washington, D.C.

SECTION 3

APPENDIX A



SHEALY CONSULTING, LLC
CHAIN OF CUSTODY RECORD
603 S. Lake Drive • Lexington, SC 29072
Telephone No. (803) 808-3113 Fax No. (803) 808-3119
www.shealyconsulting.net

Number 1003

Client		Report to Contact		Telephone No. / Fax No. / E-mail		Quote No.	
B&B Consultants		DENISE Longo		434-372-3393/434-372-0781		Page 1 of 1	
Address		Sampler's Signature		1 = No Preservative 3 = H2SO4 5 = NaOH			
316 E. Third St		<i>Andrew Alexander</i>		2 = HNO3 4 = HCl 6 = Other			
City		Printed Name		Parameters		Receipt TFC	
Chase City		Andrew Alexander		PH 6.19 1306 Temp 83.1306 TRC 0.0 1308 2-22-11		A273	
Project Name		P.O. No.					
McKenney							
Project No.		Sample ID / Description (Containers for each sample may be combined on one line.)		Sampler Start Date Time		Sampler End Date Time	
				Date Time		Date Time	
Final Effluent		2/21/11 1300		2/22/11 1300		C1	
Compositor Blank		2/21/11 1300		2/21 13:02		G2	
Filtration Blank				2/22/11 13:04		G2	
Final Effluent		2/21/11 13:00		2/22/11 13:00		C2	
1. Relinquished by		Date Time		1. Received by		Date Time	
<i>Andrew Alexander</i>		2/22/11 14:15					
2. Relinquished by		Date Time		2. Received by		Date Time	
3. Relinquished by		Date Time		3. Laboratory Received by		Date Time	
				<i>Charlotte Thoma</i>		2/23/11 10:20	

LAB USE ONLY		Received on ice (Circle) Yes No		Ice Pack		Receipt Temp. °C		Temp. Blank Y N	
Possible Hazard Identification		<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown				1.2		Y N	

DISTRIBUTION: WHITE-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: SCF-TS-248 Effective Date:

WEATHER DATA SUMMARY

FACILITY: MCKENNEY STP

SAMPLE DATE: FEB 21-22, 2011

SOURCE: NATIONAL WEATHER SERVICE KPTB, PETERSBURG, VA

Date	Avg Temp (F)	Max Temp (F)	Min Temp (F)	Precip (IN)	Avg Wind (mph)	Max Wind (mph)
2/7/2011	42	57	26	0	1	10
2/8/2011	42	51	32	0	8	18
2/9/2011	29	39	19	0	3	8
2/10/2011	34	44	23	0	4	13
2/11/2011	34	51	17	0	2	7
2/12/2011	36	55	17	0	5	22
2/13/2011	44	62	26	0	4	15
2/14/2011	53	71	35	0	12	26
2/15/2011	40	53	26	0	6	17
2/16/2011	42	62	23	0	3	15
2/17/2011	50	71	30	0	4	16
2/18/2011	68	78	57	0	9	17
2/19/2011	62	69	55	0	13	28
2/20/2011	40	57	23	0	3	13
2/21/2011	62	75	50	0	10	20
2/22/2011	38	44	33	0.01	9	17

SHEALY CONSULTING, LLC.

WER / BIOASSAY DATA FORM

FACILITY: <u>McKenney</u>	TEST: LAB WATER TEST
LAB DILUTION WATER ID: <u>EPA 052</u>	
HARDNESS USED: <u>87 mg/L</u>	
SUBSTOCK: <u>1.5 mg/L CuSO₄ · 5H₂O</u> (= 1 mg/L Cu)	

Test Species: <u>C. dubia</u>	Test Start Date/Time: <u>2/23/11 1500</u>
Age: <u><24h</u>	Analyst Initials @ Start: <u>EWJ</u>
Source/Neonate ID: <u>SC 261</u>	24 hour Reading Time: <u>2/24/11 1415</u>
Incubator #: <u>2</u>	Analyst Initials @ 24 hours: <u>EWJ</u>
Board #: <u>SS2</u>	Test End Date/Time: <u>2/25/11 1430</u>
Thermometer #: <u>7679</u>	Analyst Initials @ End: <u>EWJ</u>

WATER CHEMISTRY DATA

Treatment	Temp.	D.O.	pH	Temp.	D.O.	pH	Temp.	D.O.	pH
% Substock	(°C)	(mg/l)	(SU)	(°C)	(mg/l)	(SU)	(°C)	(mg/l)	(SU)
0 Hrs.	0 Hrs.	0 Hrs.	0 Hrs.	24 Hrs.	24 Hrs.	24 Hrs.	48 Hrs.	48 Hrs.	48 Hrs.
Lab Control	25.6	8.04	7.92	24.8	7.98	7.90	26.0	8.18	7.93
0.25	25.3	8.01	7.96	24.7	7.97	8.00	25.9	8.15	8.03
0.39	25.2	8.01	8.01	24.6	8.00	8.03	25.9	8.10	8.07
0.60	25.0	8.06	8.01	24.6	8.02	8.04	26.0	8.11	8.07
0.9	25.2	8.13	8.01	24.5	8.01	8.04	25.8	8.07	8.06
1.4	25.4	8.10	7.99	24.9	8.00	8.04	25.8	8.07	8.07
2.1	25.0	8.00	7.99	24.8	8.01	8.04	25.9	8.02	8.07

- Surrogate cups contain 5 organisms at test initiation.

TOTAL METAL LC50 = 16.13 µg/L Cu

DISSOLVED METAL LC50 = 16.13 µg/L Cu

MORTALITY DATA: *McKenney Labwater Test* 2/23/11

Treatment %. Substock	Concentration $\frac{\mu\text{g/L Cu}}{\text{Tot. / Diss.}}$	Final $\frac{\mu\text{g/L Cu}}{\text{(Dissolved)}}$	Rep.	# Dead 24 Hours	# Dead 48 Hours	% Mortality 48 Hours
Lab Control	<1/<1	<1	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
0.25	2.3/2.1	-	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
0.39	3.9/3.7	-	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
0.60	5.5/5.2	-	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
0.90	8.6/8.5	-	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
1.4	13/13	9.1	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
2.1	20/20	15	A	5	5	100%
			B	5	5	
			C	0	5	
			D	3	5	
			A			
			B			
			C			
			D			
			A			
			B			
			C			
			D			

Acute Serial Dilution-48 Hr Survival

Start Date: 2/23/2011	Test ID: MCKLW1T	Sample ID: WER
End Date: 2/25/2011	Lab ID: SCLLC	Sample Type: CUSO-Copper sulfate
Sample Date:	Protocol: EPAAW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
2.3	1.0000	1.0000	1.0000	1.0000
3.9	1.0000	1.0000	1.0000	1.0000
5.5	1.0000	1.0000	1.0000	1.0000
8.6	1.0000	1.0000	1.0000	1.0000
13	1.0000	1.0000	1.0000	1.0000
20	0.0000	0.0000	0.0000	0.0000

Transform: Arcsin Square Root								Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
2.3	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
3.9	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
5.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
8.6	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
13	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
20	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	0	20
								20	20

Auxiliary Tests

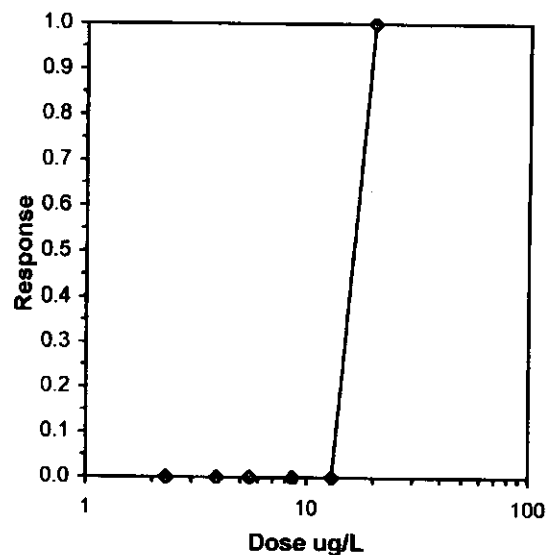
Shapiro-Wilk's Test indicates normal distribution ($p > 0.01$)
 Equality of variance cannot be confirmed

Statistic	Critical	Skew	Kurt
1	0.884		

Graphical Method

Trim Level	EC50
0.0%	16.125

16.125



Acute Serial Dilution-48 Hr Survival

Start Date: 2/23/2011	Test ID: MCKLW1D	Sample ID: WER
End Date: 2/25/2011	Lab ID: SCLLC	Sample Type: CUSO-Copper sulfate
Sample Date:	Protocol: EPAAW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
2.1	1.0000	1.0000	1.0000	1.0000
3.7	1.0000	1.0000	1.0000	1.0000
5.2	1.0000	1.0000	1.0000	1.0000
8.5	1.0000	1.0000	1.0000	1.0000
13	1.0000	1.0000	1.0000	1.0000
20	0.0000	0.0000	0.0000	0.0000

Transform: Arcsin Square Root								Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
2.1	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
3.7	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
5.2	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
8.5	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
13	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
20	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

Auxiliary Tests

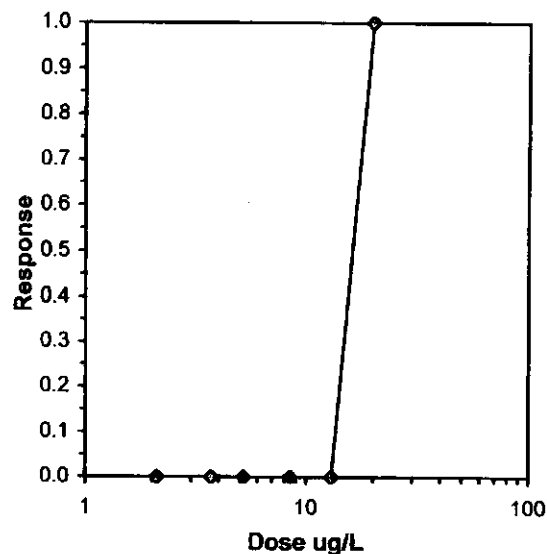
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)
 Equality of variance cannot be confirmed

Statistic	Critical	Skew	Kurt
1	0.884		

Graphical Method

Trim Level	EC50
0.0%	16.125

16.125



SHEALY CONSULTING, LLC.

WER / BIOASSAY DATA FORM

FACILITY: <u>McKenney</u>	TEST: SIMULATED STREAM
EFFLUENT ID: <u>A 273</u>	
REC. STREAM ID: <u>N/A</u>	
SIMULATED STREAM MIX: <u>100% Effluent</u>	
LAB DILUTION WATER: <u>EPA 052</u>	
TEST HARDNESS: <u>100</u>	
PRETREATMENT: <u>N/A</u>	
SUBSTOCK: <u>1.5 mg/L CuSO₄ · 5H₂O (= 1 mg/L Cu)</u>	

Test Species: <u>C. dubia</u>	Test Start Date/Time: <u>2/23/11 1500</u>
Age: <u><24 h</u>	Analyst Initials @ Start: <u>EWI</u>
Source/Neonate ID: <u>SC 261</u>	24 hour Reading Time: <u>2/24/11 1415</u>
Incubator #: <u>2</u>	Analyst Initials @ 24 hours: <u>EWI</u>
Board #: <u>S2</u>	Test End Date/Time: <u>2/25/11 1430</u>
Thermometer #: <u>7679</u>	Analyst Initials @ End: <u>EWI</u>

WATER CHEMISTRY DATA

Treatment	Temp.	D.O.	pH	Temp.	D.O.	pH	Temp.	D.O.	pH
% Substock	(°C)	(mg/l)	(SU)	(°C)	(mg/l)	(SU)	(°C)	(mg/l)	(SU)
	0 Hrs.	0 Hrs.	0 Hrs.	24 Hrs.	24 Hrs.	24 Hrs.	48 Hrs.	48 Hrs.	48 Hrs.
Lab Control	25.0	8.15	8.03	24.7	7.95	8.06	25.9	8.00	8.09
Simstream	24.7	8.09	7.32	24.7	7.94	7.91	26.0	8.03	7.96
3.2	24.4	8.07	7.35	24.9	7.92	7.92	26.0	8.06	7.94
4.9	24.3	8.05	7.33	24.6	7.84	7.92	25.9	8.00	7.94
7.5	24.6	8.13	7.31	24.6	7.76	7.92	25.8	8.01	7.95
11.6	24.8	8.08	7.23	24.5	7.85	7.92	25.7	8.00	7.93
17.5	25.0	7.94	7.36	24.4	7.88	7.92	25.8	8.01	7.93
27.5	24.9	7.91	7.35	24.6	7.89	7.91	26.0	8.03	7.93
42.3	24.7	7.80	7.33	24.5	7.87	7.91	25.7	8.01	7.92

Surrogate cups contain 5 organisms at test initiation.

TOTAL METAL LC50 = 118.8 µg/L Cu · DISSOLVED METAL LC50 = 84.45 µg/L Cu

MORTALITY DATA: McKenney Simstream Test 2/23/11

Concentration % Substock	Concentration us/L Cu Tot. / Diss.	Final us/L Cu (Dissolved)	Rep.	# Dead 24 Hours	# Dead 48 Hours	% Mortality 48 Hours
Lab Control	<1/<1	<1	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
Simstream	26/20	20	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
3.2	56/44	-	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
4.9	78/60	52	A	0	0	0
			B	0	0	
			C	0	0	
			D	0	0	
7.5	110/77	71	A	0	0	15%
			B	0	0	
			C	0	1	
			D	0	2	
11.6	140/100	95	A	5	/	100%
			B	5		
			C	5		
			D	5		
17.9	200/150	-	A	5	/	100%
			B	5		
			C	5		
			D	5		
27.5	310/220	-	A	5	/	100%
			B	5		
			C	5		
			D	5		
42.3	450/320	-	A	5	/	100%
			B	5		
			C	5		
			D	5		
			A			
			B			
			C			
			D			
			A			
			B			
			C			
			D			

Acute Serial Dilution-48 Hr Survival

Start Date: 2/23/2011	Test ID: MCKSS1T	Sample ID: WER
End Date: 2/25/2011	Lab ID: SCLLC	Sample Type: CUSO-Copper sulfate
Sample Date:	Protocol: EPAAW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000
78	1.0000	1.0000	1.0000	1.0000
110	1.0000	1.0000	0.8000	0.6000
140	0.0000	0.0000	0.0000	0.0000
200	0.0000	0.0000	0.0000	0.0000
310	0.0000	0.0000	0.0000	0.0000
450	0.0000	0.0000	0.0000	0.0000

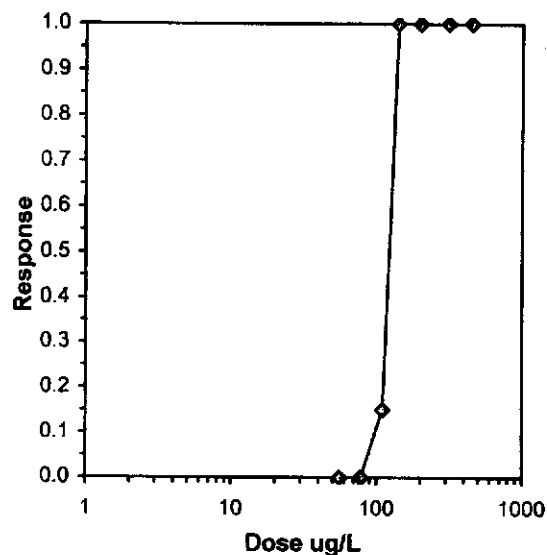
Transform: Arcsin Square Root								Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
56	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
78	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
110	0.8500	0.8500	1.1709	0.8861	1.3453	18.840	4	3	20
140	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
200	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
310	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
450	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

Auxiliary Tests

Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	Statistic	Critical	Skew	Kurt
Equality of variance cannot be confirmed	0.6604	0.844	-1.014	5.17655

Trimmed Spearman-Kärber

Trim Level	EC50	95% CL	
0.0%	118.77	113.35	124.45
5.0%	120.14	113.68	126.96
10.0%	121.10	112.54	130.31
20.0%	121.48	118.29	124.77
Auto-0.0%	118.77	113.35	124.45



Acute Serial Dilution-48 Hr Survival

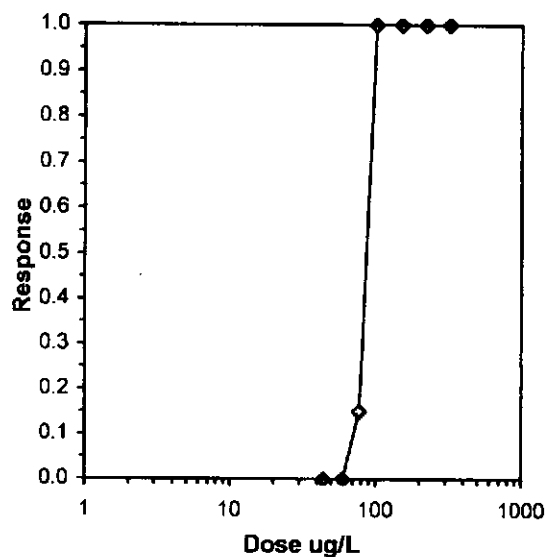
Start Date: 2/23/2011 Test ID: MCKSS1D Sample ID: WER
 End Date: 2/25/2011 Lab ID: SCLLC Sample Type: CUSO-Copper sulfate
 Sample Date: Protocol: EPAAW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
44	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000
77	1.0000	1.0000	0.8000	0.6000
100	0.0000	0.0000	0.0000	0.0000
150	0.0000	0.0000	0.0000	0.0000
220	0.0000	0.0000	0.0000	0.0000
320	0.0000	0.0000	0.0000	0.0000

Transform: Arcsin Square Root								Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
44	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
60	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
77	0.8500	0.8500	1.1709	0.8861	1.3453	18.840	4	3	20
100	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
150	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
220	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
320	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.01$)	0.6604	0.844	-1.014	5.17655
Equality of variance cannot be confirmed				

Trimmed Spearman-Kärber				
Trim Level	EC50	95% CL		
0.0%	84.451	81.076	87.967	
5.0%	85.106	81.142	89.263	
10.0%	85.568	80.449	91.012	
20.0%	85.749	83.308	88.262	
Auto-0.0%	84.451	81.076	87.967	



SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC
603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **McKenney WER1**

Analytical Results for Effluent and Blanks

Lot Number: **MB23022**

Date Completed: **03/02/2011**


Lucas Odom
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative **Shealy Consulting LLC** **Lot Number: MB23022**

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MB23022

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Effluent	Aqueous	02/22/2011 1302	02/23/2011
(1 sample)				

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MB23022

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	Effluent	Aqueous	BOD, 5 day	SM 5210B	4.2		mg/L	5
(1 detection)								

Client: **Shealy Consulting LLC**Laboratory ID: **MB23022-001**Description: **Effluent**Matrix: **Aqueous**Date Sampled: **02/22/2011 1302**Date Received: **02/23/2011****Inorganic non-metals**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(BOD, 5 day) SM 5210B	1	02/28/2011 1430	SMH	02/23/2011 1604	6209

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
BOD, 5 day		SM 5210B	4.2		2.0	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com**Page: 5 of 5**
Level 1 Report v2.1

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC
603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **WER1 Labwater**

Lot Number: **MB28045**
Date Completed: **03/11/2011**


Lucas Odom
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

Description: Lab Control

Matrix: Aqueous

Date Sampled: 02/22/2011

Date Received: 02/28/2011

Inorganic non-metals

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	03/03/2011 0448	PMM		54068
2	SM4500-NH3	(Ammonia - N) 350.1	1	03/11/2011 1550	PMM	03/11/2011 1044	54733
1		(DOC) 5310C	1	03/09/2011 0337	MML		54560
1		(Hardness (to) SM	10	03/07/2011 1821	MML		54383
1		(Specific Con) 120.1	1	03/03/2011 0438	PMM		54069
1		(TOC) SM 5310C	1	03/09/2011 1812	MML		54518
1		(TSS) SM 2540D	1	03/01/2011 0833	MML		53889

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Alkalinity		SM 2320B	63		10	mg/L	1
Ammonia - N (phenate)		350.1	ND		0.10	mg/L	2
DOC		5310C	1.8		1.0	mg/L	1
Hardness (total)		SM 2340C	ND		100	mg/L	1
Specific Conductance		120.1	310		2.00	umhos/cm	1
TOC		SM 5310C	1.2		1.0	mg/L	1
TSS		SM 2540D	ND		1.0	mg/L	1

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/08/2011 0042	CDF	03/07/2011 1645	54349
2	200.7	200.7	1	03/08/2011 1321	CDF	03/07/2011 1645	54349

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Aluminum	7429-90-5	200.7	ND		0.20	mg/L	1
Dissolved Antimony	7440-36-0	200.7	ND		0.010	mg/L	1
Dissolved Arsenic	7440-38-2	200.7	ND		0.010	mg/L	1
Dissolved Barium	7440-39-3	200.7	ND		0.025	mg/L	1
Dissolved Beryllium	7440-41-7	200.7	ND		0.0040	mg/L	1
Dissolved Cadmium	7440-43-9	200.7	ND		0.0020	mg/L	1
Dissolved Calcium	7440-70-2	200.7	12		5.0	mg/L	1
Dissolved Chromium	7440-47-3	200.7	ND		0.0050	mg/L	2
Dissolved Cobalt	7440-48-4	200.7	ND		0.025	mg/L	1
Dissolved Copper	7440-50-8	200.7	ND		0.0050	mg/L	2
Dissolved Iron	7439-89-6	200.7	ND		0.10	mg/L	2
Dissolved Lead	7439-92-1	200.7	ND		0.010	mg/L	2
Dissolved Magnesium	7439-95-4	200.7	12		5.0	mg/L	2
Dissolved Manganese	7439-96-5	200.7	ND		0.015	mg/L	2
Dissolved Molybdenum	7439-98-7	200.7	ND		0.040	mg/L	1
Dissolved Nickel	7440-02-0	200.7	ND		0.040	mg/L	1
Dissolved Potassium	7440-09-7	200.7	ND		5.0	mg/L	2
Dissolved Selenium	7782-49-2	200.7	ND		0.010	mg/L	1
Dissolved Silver	7440-22-4	200.7	ND		0.0050	mg/L	2

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 5 of 6

Level 1 Report v2.1

Description: Lab Control

Matrix: Aqueous

Date Sampled: 02/22/2011

Date Received: 02/28/2011

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/08/2011 0042	CDF	03/07/2011 1645	54349
2	200.7	200.7	1	03/08/2011 1321	CDF	03/07/2011 1645	54349

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Sodium	7440-23-5	200.7	27		5.0	mg/L	1
Dissolved Thallium	7440-28-0	200.7	ND		0.050	mg/L	1
Dissolved Tin	7440-31-5	200.7	ND		0.050	mg/L	2
Dissolved Titanium	7440-32-6	200.7	ND		0.050	mg/L	2
Dissolved Vanadium	7440-62-2	200.7	ND		0.050	mg/L	2
Dissolved Zinc	7440-66-6	200.7	ND		0.020	mg/L	1

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/08/2011 0038	CDF	03/07/2011 1645	54349
2	200.7	200.7	1	03/08/2011 1315	CDF	03/07/2011 1645	54349

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Aluminum	7429-90-5	200.7	ND		0.20	mg/L	1
Antimony	7440-36-0	200.7	ND		0.010	mg/L	1
Arsenic	7440-38-2	200.7	ND		0.010	mg/L	1
Barium	7440-39-3	200.7	ND		0.025	mg/L	1
Beryllium	7440-41-7	200.7	ND		0.0040	mg/L	1
Cadmium	7440-43-9	200.7	ND		0.0020	mg/L	1
Calcium	7440-70-2	200.7	13		5.0	mg/L	1
Chromium	7440-47-3	200.7	ND		0.0050	mg/L	2
Cobalt	7440-48-4	200.7	ND		0.025	mg/L	1
Copper	7440-50-8	200.7	ND		0.0050	mg/L	2
Iron	7439-89-6	200.7	ND		0.10	mg/L	2
Lead	7439-92-1	200.7	ND		0.010	mg/L	2
Magnesium	7439-95-4	200.7	13		5.0	mg/L	2
Manganese	7439-96-5	200.7	ND		0.015	mg/L	2
Molybdenum	7439-98-7	200.7	ND		0.040	mg/L	1
Nickel	7440-02-0	200.7	ND		0.040	mg/L	1
Potassium	7440-09-7	200.7	ND		5.0	mg/L	2
Selenium	7782-49-2	200.7	ND		0.010	mg/L	1
Silver	7440-22-4	200.7	ND		0.0050	mg/L	2
Sodium	7440-23-5	200.7	28		5.0	mg/L	1
Thallium	7440-28-0	200.7	ND		0.050	mg/L	1
Tin	7440-31-5	200.7	ND		0.050	mg/L	2
Titanium	7440-32-6	200.7	ND		0.050	mg/L	2
Vanadium	7440-62-2	200.7	ND		0.050	mg/L	2
Zinc	7440-66-6	200.7	ND		0.020	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Client: Shealy Consulting LLC

Laboratory ID: MB17029-002

Description: EPA 052

Matrix: Aqueous

Date Sampled: 02/16/2011 1400

Date Received: 02/17/2011

Inorganic non-metals

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Hardness (to) SM	1	02/25/2011 1424	PMM		53511
Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Hardness (total)		SM 2340C	87		10	mg/L	1

PQL = Practical quantitation limit

NO = Not detected at or above the PQL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

B = Detected in the method blank

J = Estimated result < PQL and \geq MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 9

Level 1 Report v2.1

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC

603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **McKenney WER1**

Lot Number: **MB28007**

Date Completed: **03/11/2011**



Lucas Odom
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MB28007

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MB28007

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Effluent	Aqueous	02/22/2011 1305	02/28/2011
002	Compositor Blank	Aqueous	02/21/2011 1300	02/28/2011
003	Filtration Blank	Aqueous	02/22/2011 1304	02/28/2011
004	SS Carboy Blank	Aqueous	02/23/2011	02/28/2011
005	LW Cylinder Blank	Aqueous	02/23/2011	02/28/2011
006	SS Cylinder Blank	Aqueous	02/23/2011	02/28/2011
007	Test Cup Blank	Aqueous	02/23/2011	02/28/2011

(7 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MB28007

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	Effluent	Aqueous	Alkalinity	SM 2320B	49		mg/L	5
001	Effluent	Aqueous	Ammonia - N (phenate)	350.1	0.33		mg/L	5
001	Effluent	Aqueous	DOC	5310C	5.0		mg/L	5
001	Effluent	Aqueous	Hardness (total)	SM 2340C	100		mg/L	5
001	Effluent	Aqueous	Specific Conductance	120.1	486		umhos/	5
001	Effluent	Aqueous	TOC	SM 5310C	5.6		mg/L	5
001	Effluent	Aqueous	TSS	SM 2540D	3.8		mg/L	5
001	Effluent	Aqueous	Dissolved Barium	200.8	17		ug/L	5
001	Effluent	Aqueous	Dissolved Calcium	200.8	29000		ug/L	5
001	Effluent	Aqueous	Dissolved Copper	200.8	21		ug/L	5
001	Effluent	Aqueous	Dissolved Iron	200.8	140		ug/L	5
001	Effluent	Aqueous	Dissolved Magnesium	200.8	6200		ug/L	5
001	Effluent	Aqueous	Dissolved Manganese	200.8	38		ug/L	5
001	Effluent	Aqueous	Dissolved Potassium	200.8	16000		ug/L	5
001	Effluent	Aqueous	Dissolved Sodium	200.8	47000		ug/L	5
001	Effluent	Aqueous	Dissolved Zinc	200.8	17		ug/L	6
001	Effluent	Aqueous	Aluminum	200.8	120		ug/L	6
001	Effluent	Aqueous	Barium	200.8	21		ug/L	6
001	Effluent	Aqueous	Calcium	200.8	31000		ug/L	6
001	Effluent	Aqueous	Copper	200.8	29		ug/L	6
001	Effluent	Aqueous	Iron	200.8	290		ug/L	6
001	Effluent	Aqueous	Magnesium	200.8	6500		ug/L	6
001	Effluent	Aqueous	Manganese	200.8	41		ug/L	6
001	Effluent	Aqueous	Potassium	200.8	17000		ug/L	6
001	Effluent	Aqueous	Sodium	200.8	48000		ug/L	6
001	Effluent	Aqueous	Zinc	200.8	21		ug/L	6

(26 detections)

Description: Effluent

Matrix: Aqueous

Date Sampled: 02/22/2011 1305

Date Received: 02/28/2011

Inorganic non-metals

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	03/03/2011 0358	PMM		54068
2	SM4500-NH3	(Ammonia - N) 350.1	1	03/11/2011 1539	PMM	03/11/2011 1044	54733
1		(DOC) 5310C	1	03/09/2011 0302	MML		54560
1		(Hardness (to) SM	1	03/07/2011 1403	MML		54383
1		(Specific Con) 120.1	1	03/03/2011 0349	PMM		54069
1		(TOC) SM 5310C	1	03/09/2011 1728	MML		54518
1		(TSS) SM 2540D	1	03/01/2011 0833	MML		53889

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Alkalinity		SM 2320B	49		10	mg/L	1
Ammonia - N (phenate)		350.1	0.33 ✓		0.10	mg/L	2
DOC		5310C	5.0		1.0	mg/L	1
Hardness (total)		SM 2340C	100 ✓		10	mg/L	1
Specific Conductance		120.1	486		2.00	umhos/cm	1
TOC		SM 5310C	5.6		1.0	mg/L	1
TSS		SM 2540D	3.8 ✓		1.0	mg/L	1

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1804	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Aluminum	7429-90-5	200.8	ND		40	ug/L	1
Dissolved Antimony	7440-36-0	200.8	ND		1.0	ug/L	1
Dissolved Arsenic	7440-38-2	200.8	ND		1.0	ug/L	1
Dissolved Barium	7440-39-3	200.8	17		5.0	ug/L	1
Dissolved Beryllium	7440-41-7	200.8	ND		0.40	ug/L	1
Dissolved Cadmium	7440-43-9	200.8	ND		0.10	ug/L	1
Dissolved Calcium	7440-70-2	200.8	29000		200	ug/L	1
Dissolved Chromium	7440-47-3	200.8	ND		5.0	ug/L	1
Dissolved Cobalt	7440-48-4	200.8	ND		5.0	ug/L	1
Dissolved Copper	7440-50-8	200.8	21		1.0	ug/L	1
Dissolved Iron	7439-89-6	200.8	140		20	ug/L	1
Dissolved Lead	7439-92-1	200.8	ND		1.0	ug/L	1
Dissolved Magnesium	7439-95-4	200.8	6200		50	ug/L	1
Dissolved Manganese	7439-96-5	200.8	38		5.0	ug/L	1
Dissolved Molybdenum	7439-98-7	200.8	ND		10	ug/L	1
Dissolved Nickel	7440-02-0	200.8	ND		5.0	ug/L	1
Dissolved Potassium	7440-09-7	200.8	16000		200	ug/L	1
Dissolved Selenium	7782-49-2	200.8	ND		1.0	ug/L	1
Dissolved Silver	7440-22-4	200.8	ND		1.0	ug/L	1
Dissolved Sodium	7440-23-5	200.8	47000		200	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Description: Effluent

Matrix: Aqueous

Date Sampled: 02/22/2011 1305

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1804	KJC	02/28/2011 1557	53828
Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Thallium	7440-28-0	200.8	ND		0.50	ug/L	1
Dissolved Tin	7440-31-5	200.8	ND		5.0	ug/L	1
Dissolved Titanium	7440-32-6	200.8	ND		5.0	ug/L	1
Dissolved Vanadium	7440-62-2	200.8	ND		5.0	ug/L	1
Dissolved Zinc	7440-66-6	200.8	17		10	ug/L	1

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1748	KJC	02/28/2011 1557	53828
Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Aluminum	7429-90-6	200.8	120		40	ug/L	1
Antimony	7440-36-0	200.8	ND		1.0	ug/L	1
Arsenic	7440-38-2	200.8	ND		1.0	ug/L	1
Barium	7440-39-3	200.8	21		5.0	ug/L	1
Beryllium	7440-41-7	200.8	ND		0.40	ug/L	1
Cadmium	7440-43-9	200.8	ND		0.10	ug/L	1
Calcium	7440-70-2	200.8	31000		200	ug/L	1
Chromium	7440-47-3	200.8	ND		5.0	ug/L	1
Cobalt	7440-48-4	200.8	ND		5.0	ug/L	1
Copper	7440-50-8	200.8	29		1.0	ug/L	1
Iron	7439-89-6	200.8	290		20	ug/L	1
Lead	7439-92-1	200.8	ND		1.0	ug/L	1
Magnesium	7439-95-4	200.8	6500		50	ug/L	1
Manganese	7439-96-5	200.8	41		5.0	ug/L	1
Molybdenum	7439-98-7	200.8	ND		10	ug/L	1
Nickel	7440-02-0	200.8	ND		5.0	ug/L	1
Potassium	7440-09-7	200.8	17000		200	ug/L	1
Selenium	7782-49-2	200.8	ND		1.0	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	ug/L	1
Sodium	7440-23-5	200.8	48000		200	ug/L	1
Thallium	7440-28-0	200.8	ND		0.50	ug/L	1
Tin	7440-31-5	200.8	ND		5.0	ug/L	1
Titanium	7440-32-6	200.8	ND		5.0	ug/L	1
Vanadium	7440-62-2	200.8	ND		5.0	ug/L	1
Zinc	7440-66-6	200.8	21		10	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 12

Level 1 Report v2.1

Client: **Shealy Consulting LLC**Laboratory ID: **MB28007-002**Description: **Compositor Blank**Matrix: **Aqueous**Date Sampled: **02/21/2011 1300**Date Received: **02/28/2011****ICP-MS**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1812	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 7 of 12

Level 1 Report v2.1

Client: Shealy Consulting LLC	Laboratory ID: MB28007-003
Description: Filtration Blank	Matrix: Aqueous
Date Sampled: 02/22/2011 1304	
Date Received: 02/28/2011	

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1843	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 8 of 12

Level 1 Report v2.1

Client: **Shealy Consulting LLC**Laboratory ID: **MB28007-004**Description: **SS Carboy Blank**Matrix: **Aqueous**Date Sampled: **02/23/2011**Date Received: **02/28/2011****ICP-MS**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1851	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com**Page: 9 of 12**

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28007-005

Description: LW Cylinder Blank

Matrix: Aqueous

Date Sampled: 02/23/2011

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1859	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 10 of 12

Level 1 Report v2.1

Client: Shealy Consulting LLC Description: SS Cylinder Blank Date Sampled: 02/23/2011 Date Received: 02/28/2011	Laboratory ID: MB28007-006 Matrix: Aqueous
--	---

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1922	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the PQL	J = Estimated result < PQL and ≥ MDL	P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"	N = Recovery is out of criteria	H = Out of holding time

Client: Shealy Consulting LLC

Laboratory ID: MB28007-007

Description: Test Cup Blank

Matrix: Aqueous

Date Sampled: 02/23/2011

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1930	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 12 of 12

Level 1 Report v2.1

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC
603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **McKenney LW1**

*Initial Lab Water Test
Concentrations*

Lot Number: **MB28042**
Date Completed: **03/09/2011**


Lucas Odom
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MB28042

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MB28042

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Lab Control	Aqueous	02/23/2011 1332	02/28/2011
002	0.25	Aqueous	02/23/2011 1333	02/28/2011
003	0.39	Aqueous	02/23/2011 1335	02/28/2011
004	0.6	Aqueous	02/23/2011 1337	02/28/2011
005	0.9	Aqueous	02/23/2011 1338	02/28/2011
006	1.4	Aqueous	02/23/2011 1340	02/28/2011
007	2.1	Aqueous	02/23/2011 1342	02/28/2011
008	LW Filtration Blank	Aqueous	02/23/2011 1330	02/28/2011

(8 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MB28042

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	0.25	Aqueous	Dissolved Copper	200.8	2.1		ug/L	6
002	0.25	Aqueous	Copper	200.8	2.3		ug/L	6
003	0.39	Aqueous	Dissolved Copper	200.8	3.7		ug/L	7
003	0.39	Aqueous	Copper	200.8	3.9		ug/L	7
004	0.6	Aqueous	Dissolved Copper	200.8	5.2		ug/L	8
004	0.6	Aqueous	Copper	200.8	5.5		ug/L	8
005	0.9	Aqueous	Dissolved Copper	200.8	8.5		ug/L	9
005	0.9	Aqueous	Copper	200.8	8.6		ug/L	9
006	1.4	Aqueous	Dissolved Copper	200.8	13		ug/L	10
006	1.4	Aqueous	Copper	200.8	13		ug/L	10
007	2.1	Aqueous	Dissolved Copper	200.8	20		ug/L	11
007	2.1	Aqueous	Copper	200.8	20		ug/L	11

(12 detections)

Client: Shealy Consulting LLC

Laboratory ID: MB28042-001

Description: Lab Control

Matrix: Aqueous

Date Sampled: 02/23/2011 1332

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1650	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1642	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and > MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 5 of 12
Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28042-002

Description: 0.25

Matrix: Aqueous

Date Sampled: 02/23/2011 1333

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1706	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	2.1		1.0	ug/L	1

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1658	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	2.3		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 12
Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28042-003

Description: 0.39

Matrix: Aqueous

Date Sampled: 02/23/2011 1335

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1721	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	3.7		1.0	ug/L	1

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1714	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	3.9		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 7 of 12

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28042-004

Description: 0.6

Matrix: Aqueous

Date Sampled: 02/23/2011 1337

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1737	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	5.2		1.0	ug/L	1

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1729	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	5.5		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 8 of 12

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28042-005

Description: 0.9

Matrix: Aqueous

Date Sampled: 02/23/2011 1338

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1808	FTS	03/01/2011 1255	53882
Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	8.5		1.0	ug/L	1

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1800	FTS	03/01/2011 1255	53882
Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	8.6		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 9 of 12

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28042-006

Description: 1.4

Matrix: Aqueous

Date Sampled: 02/23/2011 1340

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1824	FTS	03/01/2011 1255	53882
Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	13		1.0	ug/L	1

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1816	FTS	03/01/2011 1255	53882
Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	13		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 10 of 12

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28042-007

Description: 2.1

Matrix: Aqueous

Date Sampled: 02/23/2011 1342

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/08/2011 2255	KJC	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	20		1.0	ug/L	1

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1832	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	20		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 11 of 12

Level 1 Report v2.1

Client: Shealy Consulting LLC Description: LW Filtration Blank Date Sampled: 02/23/2011 1330 Date Received: 02/28/2011	Laboratory ID: MB28042-008 Matrix: Aqueous
---	---

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1847	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the PQL	J = Estimated result < PQL and ≥ MDL	P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"		N = Recovery is out of criteria
		H = Out of holding time

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC

603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **Mckenney SSI**

*Initial Simstream Test
Concentrations*

Lot Number: **MB28040**

Date Completed: **03/03/2011**


Lucas Odom

Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MB28040

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MB28040

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Simstream	Aqueous	02/23/2011 1350	02/28/2011
002	3.2	Aqueous	02/23/2011 1352	02/28/2011
003	4.9	Aqueous	02/23/2011 1354	02/28/2011
004	7.5	Aqueous	02/23/2011 1355	02/28/2011
005	11.6	Aqueous	02/23/2011 1357	02/28/2011
006	17.9	Aqueous	02/23/2011 1359	02/28/2011
007	27.5	Aqueous	02/23/2011 1400	02/28/2011
008	42.3	Aqueous	02/23/2011 1402	02/28/2011
009	SS Filtration Blank	Aqueous	02/23/2011 1346	02/28/2011

(9 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MB28040

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	Simstream	Aqueous	Dissolved Copper	200.8	20		ug/L	5
001	Simstream	Aqueous	Copper	200.8	26		ug/L	5
002	3.2	Aqueous	Dissolved Copper	200.7	0.044		mg/L	6
002	3.2	Aqueous	Copper	200.7	0.056		mg/L	6
003	4.9	Aqueous	Dissolved Copper	200.7	0.060		mg/L	7
003	4.9	Aqueous	Copper	200.7	0.078		mg/L	7
004	7.5	Aqueous	Dissolved Copper	200.7	0.077		mg/L	8
004	7.5	Aqueous	Copper	200.7	0.11		mg/L	8
005	11.6	Aqueous	Dissolved Copper	200.7	0.10		mg/L	9
005	11.6	Aqueous	Copper	200.7	0.14		mg/L	9
006	17.9	Aqueous	Dissolved Copper	200.7	0.15		mg/L	10
006	17.9	Aqueous	Copper	200.7	0.20		mg/L	10
007	27.5	Aqueous	Dissolved Copper	200.7	0.22		mg/L	11
007	27.5	Aqueous	Copper	200.7	0.31		mg/L	11
008	42.3	Aqueous	Dissolved Copper	200.7	0.32		mg/L	12
008	42.3	Aqueous	Copper	200.7	0.45		mg/L	12

(16 detections)

Client: Shealy Consulting LLC

Laboratory ID: MB28040-002

Description: 3.2

Matrix: Aqueous

Date Sampled: 02/23/2011 1352

Date Received: 02/28/2011

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/02/2011 2350	KJC	03/01/2011 1020	53885
Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.044		0.0050	mg/L	1

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/02/2011 2326	KJC	03/01/2011 1020	53885
Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.056		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 13

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28040-003

Description: 4.9

Matrix: Aqueous

Date Sampled: 02/23/2011 1354

Date Received: 02/28/2011

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0020	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.060		0.0050	mg/L	1

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0002	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.078		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 7 of 13

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28040-004

Description: 7.5

Matrix: Aqueous

Date Sampled: 02/23/2011 1355

Date Received: 02/28/2011

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0032	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.077		0.0050	mg/L	1

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0026	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.11		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 8 of 13

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28040-005

Description: 11.6

Matrix: Aqueous

Date Sampled: 02/23/2011 1357

Date Received: 02/28/2011

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0043	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.10		0.0050	mg/L	1

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0038	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.14		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 9 of 13

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28040-006

Description: 17.9

Matrix: Aqueous

Date Sampled: 02/23/2011 1359

Date Received: 02/28/2011

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0055	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.15		0.0050	mg/L	1

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0049	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.20		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 10 of 13

Level 1 Report v2.1

Client: Shealy Consulting LLC

Laboratory ID: MB28040-007

Description: 27.5

Matrix: Aqueous

Date Sampled: 02/23/2011 1400

Date Received: 02/28/2011

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0107	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.22		0.0050	mg/L	1

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0101	KJC	03/01/2011 1020	53885

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.31		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 11 of 13

Level 1 Report v2.1

Client: **Shealy Consulting LLC**Laboratory ID: **MB28040-008**Description: **42.3**Matrix: **Aqueous**Date Sampled: **02/23/2011 1402**Date Received: **02/28/2011****ICP-AES**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0131	KJC	03/01/2011 1020	53885
Parameter		CAS Number	Analytical Method	Result	Q	PQL	Units Run
Dissolved Copper		7440-50-8	200.7	0.32		0.0050	mg/L 1

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 0113	KJC	03/01/2011 1020	53885
Parameter		CAS Number	Analytical Method	Result	Q	PQL	Units Run
Copper		7440-50-8	200.7	0.45		0.0050	mg/L 1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 12 of 13

Level 1 Report v2.1

Client: Shealy Consulting LLC	Laboratory ID: MB28040-009
Description: SS Filtration Blank	Matrix: Aqueous
Date Sampled: 02/23/2011 1346	
Date Received: 02/28/2011	

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/02/2011 1635	FTS	03/01/2011 1255	53882

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 13 of 13

Level 1 Report v2.1

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC
603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **McKenney Finals**

Lot Number: **MB28006**
Date Completed: **03/04/2011**


Lucas Odom
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MB28006

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MB28006

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	LW Blank	Aqueous	02/25/2011 1433	02/28/2011
002	LW Control	Aqueous	02/25/2011 1434	02/28/2011
003	LW 1.4	Aqueous	02/25/2011 1435	02/28/2011
004	LW 2.1	Aqueous	02/25/2011 1436	02/28/2011
005	SS Blank	Aqueous	02/25/2011 1437	02/28/2011
006	SS Control	Aqueous	02/25/2011 1438	02/28/2011
007	Simstream	Aqueous	02/25/2011 1439	02/28/2011
008	SS4.9	Aqueous	02/25/2011 1440	02/28/2011
009	SS7.5	Aqueous	02/25/2011 1441	02/28/2011
010	SS11.6	Aqueous	02/25/2011 1442	02/28/2011

(10 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MB28006

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	LW 1.4	Aqueous	Dissolved Copper	200.8	9.1		ug/L	7
004	LW 2.1	Aqueous	Dissolved Copper	200.8	15		ug/L	8
007	Simstream	Aqueous	Dissolved Copper	200.8	20		ug/L	11
008	SS4.9	Aqueous	Dissolved Copper	200.7	0.052		mg/L	12
009	SS7.5	Aqueous	Dissolved Copper	200.7	0.071		mg/L	13
010	SS11.6	Aqueous	Dissolved Copper	200.7	0.095		mg/L	14

(6 detections)

Client: Shealy Consulting LLC

Laboratory ID: MB28006-001

Description: LW Blank

Matrix: Aqueous

Date Sampled: 02/25/2011 1433

Date Received: 02/28/2011

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1638	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 5 of 14

Level 1 Report v2.1

Client: **Shealy Consulting LLC**Laboratory ID: **MB28006-002**Description: **LW Control**Matrix: **Aqueous**Date Sampled: **02/25/2011 1434**Date Received: **02/28/2011****ICP-MS**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1646	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 14

Level 1 Report v2.1

Client: **Shealy Consulting LLC**Laboratory ID: **MB28006-003**Description: **LW 1.4**Matrix: **Aqueous**Date Sampled: **02/25/2011 1435**Date Received: **02/28/2011****ICP-MS**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1654	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	9.1		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 7 of 14

Level 1 Report v2.1

Client: **Shealy Consulting LLC**Laboratory ID: **MB28006-004**Description: **LW 2.1**Matrix: **Aqueous**Date Sampled: **02/25/2011 1436**Date Received: **02/28/2011****ICP-MS**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1701	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	15		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 8 of 14

Level 1 Report v2.1

Client: **Shealy Consulting LLC**Laboratory ID: **MB28006-005**Description: **SS Blank**Matrix: **Aqueous**Date Sampled: **02/25/2011 1437**Date Received: **02/28/2011****ICP-MS**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1709	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 9 of 14

Level 1 Report v2.1

Client: Shealy Consulting LLC	Laboratory ID: MB28006-006
Description: SS Control	Matrix: Aqueous
Date Sampled: 02/25/2011 1438	
Date Received: 02/28/2011	

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1717	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 10 of 14

Level 1 Report v2.1

Client: Shealy Consulting LLC	Laboratory ID: MB28006-007
Description: Simstream	Matrix: Aqueous
Date Sampled: 02/25/2011 1439	
Date Received: 02/28/2011	

ICP-MS

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/01/2011 1725	KJC	02/28/2011 1557	53828

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	20		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 11 of 14

Level 1 Report v2.1

Client: **Shealy Consulting LLC**Laboratory ID: **MB28006-008**Description: **SS4.9**Matrix: **Aqueous**Date Sampled: **02/25/2011 1440**Date Received: **02/28/2011****ICP-AES**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 2125	CDF	02/28/2011 1656	53839

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.052		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 12 of 14

Level 1 Report v2.1

Client: Shealy Consulting LLC	Laboratory ID: MB28006-009
Description: SS7.5	Matrix: Aqueous
Date Sampled: 02/25/2011 1441	
Date Received: 02/28/2011	

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 2131	CDF	02/28/2011 1656	53839

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.071		0.0050	mg/L	1

PQL = Practical quantitation limit
 ND = Not detected at or above the PQL
 Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

B = Detected in the method blank
 J = Estimated result < PQL and \geq MDL

E = Quantitation of compound exceeded the calibration range
 P = The RPD between two GC columns exceeds 40%
 N = Recovery is out of criteria
 H = Out of holding time

Client: Shealy Consulting LLC

Laboratory ID: MB28006-010

Description: SS11.6

Matrix: Aqueous

Date Sampled: 02/25/2011 1442

Date Received: 02/28/2011

ICP-AES

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	03/03/2011 2137	CDF	02/28/2011 1656	53839

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.095		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 14 of 14

Level 1 Report v2.1

SECTION 4

APPENDIX B



SHEALY CONSULTING, LLC
CHAIN OF CUSTODY RECORD

603 S. Lake Drive • Lexington, SC 29072
Telephone No. (803) 808-3113 Fax No. (803) 808-3119
www.shealyconsulting.net

Number

1636

Client: B+B Consultants		Report to Contact: Andrew Alexander		Telephone No. / Fax No. / E-mail: 434-372-3393 / 434-372-0889		Quote No. Page 1 of 1	
Address: 316 E. Third St		Sampler's Signature: Andrew Alexander		1 = No Preservative 3 = H2SO4 5 = NaOH			
City: Chase City		Printed Name: Andrew Alexander		2 = HNO3 4 = HCl 6 = Other			
Project Name: McKenney WWT		P.O. No.					
State: VA		Zip Code: 23924					
Project No.		Sample ID / Description (Containers for each sample may be combined on one line.)		Sampler Start Date Time		Sampler End Date Time	
		Final Effluent		3-28-11 12:50		3-29-11 12:50	
		Compositor Blank		3-28-11 12:49		3-28-11 12:50	
		Filtration Blank		3-29-11 13:00		3-29-11 13:01	
		Final Effluent		3-28-11 12:50		3-29-11 12:50	
1. Relinquished by: Andrew Alexander		Date: 3-29-11		Time: 13:45		1. Received by: J. Bravel	
2. Relinquished by:		Date:		Time:		2. Received by:	
3. Relinquished by:		Date:		Time:		3. Laboratory Received by:	
LAB USE ONLY		Possible Hazard Identification		Received on ice (Circle) Yes No		Ice Pack	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown						Receipt Temp. 0.2 °C	
DISTRIBUTION: WHITE-Return to laboratory with Sample(s); PINK-Field/Client Copy						Temp. Blank Y/N	
						Document Number: SCF-TS-248 Effective Date:	

WEATHER DATA SUMMARY**FACILITY: MCKENNEY STP****SAMPLE DATE: MARCH 28-29, 2011****SOURCE: NATIONAL WEATHER SERVICE KPTB, PETERSBURG, VA**

Date	Avg Temp (F)	Max Temp (F)	Min Temp (F)	Precip (IN)	Avg Wind (mph)	Max Wind (mph)
3/14/2011	48	57	39	0	8	16
3/15/2011	46	55	37	0	5	13
3/16/2011	54	62	46	0.13	4	9
3/17/2011	52	69	35	0	3	9
3/18/2011	66	84	48	0	5	13
3/19/2011	58	71	46	0	7	16
3/20/2011	47	59	35	0	3	10
3/21/2011	62	77	46	0.09	10	22
3/22/2011	63	71	53	0	6	16
3/23/2011	62	75	50	0.1	6	10
3/24/2011	54	62	46	0	6	16
3/25/2011	46	55	37	0	6	15
3/26/2011	45	48	42	0	7	14
3/27/2011	36	42	30	0.03	4	12
3/28/2011	38	51	26	0	3	12
3/29/2011	42	60	24	0	1	10

SHEALY CONSULTING, LLC.

WER / BIOASSAY DATA FORM

FACILITY: <u>McKenney</u>	TEST: <u>LAB WATER TEST</u>
LAB DILUTION WATER ID: <u>EPA 061</u>	
HARDNESS USED: <u>84</u>	
SUBSTOCK: <u>1.5 mg CuSO₄·5H₂O / L EPA (= 1 mg/LC₅₀)</u>	

Test Species: <u>C. dubia</u>	Test Start Date/Time: <u>3-30-11 1400</u>
Age: <u><24h</u>	Analyst Initials @ Start: <u>EW7</u>
Source/Neonate ID: <u>SC299</u>	24 hour Reading Time: <u>1400</u>
Incubator #: <u>2</u>	Analyst Initials @ 24 hours: <u>EW7</u>
Board #: <u>SS</u>	Test End Date/Time: <u>4-1-11 1400</u>
Thermometer #: <u>7679</u>	Analyst Initials @ End: <u>EW7</u>

WATER CHEMISTRY DATA

Treatment	Temp. (°C)	D.O. (mg/l)	pH (SU)	Temp. (°C)	D.O. (mg/l)	pH (SU)	Temp. (°C)	D.O. (mg/l)	pH (SU)
% Substock	0 Hrs.	0 Hrs.	0 Hrs.	24 Hrs.	24 Hrs.	24 Hrs.	48 Hrs.	48 Hrs.	48 Hrs.
Lab Control	24.2	8.16	7.90	25.7	7.89	7.98	24.7	8.51	8.04
0.25%	24.1	8.11	7.94	25.8	7.85	8.06	25.0	8.51	8.13
0.39%	24.1	8.16	7.94	25.9	7.78	8.06	25.2	8.47	8.16
0.60%	24.1	8.19	7.94	25.9	7.80	8.06	25.1	8.51	8.16
0.91%	24.2	8.20	7.94	25.9	7.87	8.09	24.8	8.55	8.15
1.4%	24.2	8.23	7.93	26.0	7.77	8.07	25.0	8.54	8.12
2.1%	24.2	8.27	7.93	25.2	7.78	8.06	25.3	8.54	8.13

- Surrogate cups contain 5 organisms at test initiation.

TOTAL METAL LC50 = 8.214 μg/L

DISSOLVED METAL LC50 = 7.444 μg/L

DOMeter # 06E1533
pH Meter # 1318724

MORTALITY DATA: *McKenney Labwater Test 3-30-11*

Treatment % Substock	Concentration $\frac{\mu\text{g/L Cu}}{\text{Tot. / Diss.}}$	Final $\frac{\mu\text{g/L Cu}}{(\text{Dissolved})}$	Rep.	# Dead 24 Hours	# Dead 48 Hours	% Mortality 48 Hours
✓ Lab Control	<1 / <1	<1.0	A	0	0	0% 0-5%
			B	0	0	
			C	0	0	
			D	0	1	
0.25%	2.5 / 2.4	-	A	0	0	0%
			B	0	0	
			C	0	0	
			D	0	0	
0.39%	3.8 / 3.6	2.9	A	0	0	0%
			B	0	0	
			C	0	0	
			D	0	0	
0.60%	6.6 / 6.1	5.0	A	0	0	15%
			B	1	1	
			C	0	0	
			D	1	2	
0.91%	9.4 / 8.4	7.3	A	0	2	75%
			B	2	4	
			C	3	4	
			D	3	5	
1.4%	14 / 13	11	A	5	/	100%
			B	5		
			C	5		
			D	5		
2.1%	19 / 20	-	A	5	/	100%
			B	5		
			C	5		
			D	5		
			A			
			B			
			C			
			D			
			A			
			B			
			C			
			D			

EWST 4-11-11

Daphnid Acute Test-48 Hr Survival

Start Date: 3/30/2011 Test ID: MCK2LWTC Sample ID:
 End Date: 4/1/2011 Lab ID: SCLLC Sample Type: CUSO-Copper sulfate
 Sample Date: Protocol: EPAAW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	0.8000
2.5	1.0000	1.0000	1.0000	1.0000
3.8	1.0000	1.0000	1.0000	1.0000
6.6	1.0000	0.8000	1.0000	0.6000
9.4	0.6000	0.2000	0.2000	0.0000
14	0.0000	0.0000	0.0000	0.0000
19	0.0000	0.0000	0.0000	0.0000

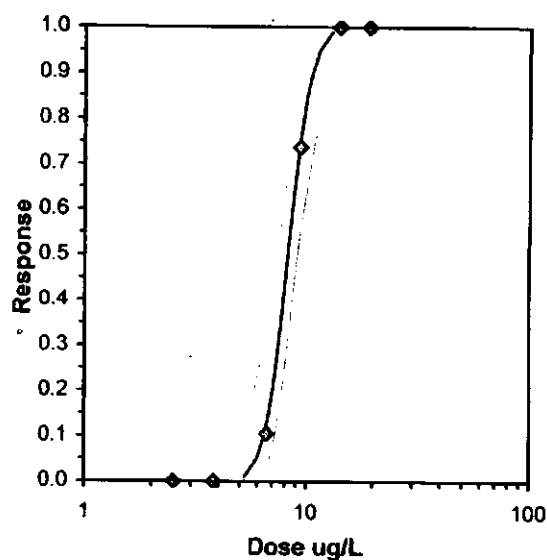
Conc-ug/L	Mean	N-Mean	Transform: Arcsin Square Root					CV%	N	Number Resp	Total Number
			Mean	Min	Max						
D-Control	0.9500	1.0000	1.2857	1.1071	1.3453			9.261	4	1	20
2.5	1.0000	1.0526	1.3453	1.3453	1.3453			0.000	4	0	20
3.8	1.0000	1.0526	1.3453	1.3453	1.3453			0.000	4	0	20
6.6	0.8500	0.8947	1.1709	0.8861	1.3453			18.840	4	3	20
9.4	0.2500	0.2632	0.5097	0.2255	0.8861			53.926	4	15	20
14	0.0000	0.0000	0.2255	0.2255	0.2255			0.000	4	20	20
19	0.0000	0.0000	0.2255	0.2255	0.2255			0.000	4	20	20

Auxiliary Tests

	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.01$)	0.89149	0.868	0.22288	1.92194
Equality of variance cannot be confirmed				

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	11.8997	2.81809	6.37623	17.4231	0.05	0.7639	9.48773	0.94	0.91453	0.08404	3
Intercept	-5.8826	2.59998	-10.979	-0.7867							
TSCR	0.01684	0.01661	-0.0157	0.04941							
Point	Probits	ug/L	95% Fiducial Limits								
EC01	2.674	5.23643	3.44209	6.17736							
EC05	3.355	5.97455	4.3735	6.80441							
EC10	3.718	6.40967	4.95817	7.18005							
EC15	3.964	6.72101	5.38784	7.45668							
EC20	4.158	6.9792	5.74797	7.69448							
EC25	4.326	7.2086	6.06801	7.91501							
EC40	4.747	7.82063	6.89745	8.57097							
EC50	5.000	8.21357	7.38694	9.06834							
EC60	5.253	8.62626	7.84809	9.67169							
EC75	5.674	9.35865	8.54131	10.9386							
EC80	5.842	9.66626	8.79728	11.533							
EC85	6.036	10.0376	9.08778	12.2904							
EC90	6.282	10.5251	9.44698	13.3427							
EC95	6.645	11.2917	9.97739	15.1129							
EC99	7.326	12.8833	10.9994	19.1863							



Daphnid Acute Test-48 Hr Survival

Start Date: 3/30/2011 Test ID: MCK2LWDC Sample ID:
 End Date: 4/1/2011 Lab ID: SCLLC Sample Type: CUSO-Copper sulfate
 Sample Date: Protocol: EPAAW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	0.8000
2.4	1.0000	1.0000	1.0000	1.0000
3.6	1.0000	1.0000	1.0000	1.0000
6.1	1.0000	0.8000	1.0000	0.6000
8.4	0.6000	0.2000	0.2000	0.0000
13	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	0.0000

Conc-ug/L	Mean	N-Mean	Transform: Arcsin Square Root					Number Resp	Total Number
			Mean	Min	Max	CV%	N		
D-Control	0.9500	1.0000	1.2857	1.1071	1.3453	9.261	4	1	20
2.4	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	0	20
3.6	1.0000	1.0526	1.3453	1.3453	1.3453	0.000	4	0	20
6.1	0.8500	0.8947	1.1709	0.8861	1.3453	18.840	4	3	20
8.4	0.2500	0.2632	0.5097	0.2255	0.8861	53.926	4	15	20
13	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
20	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

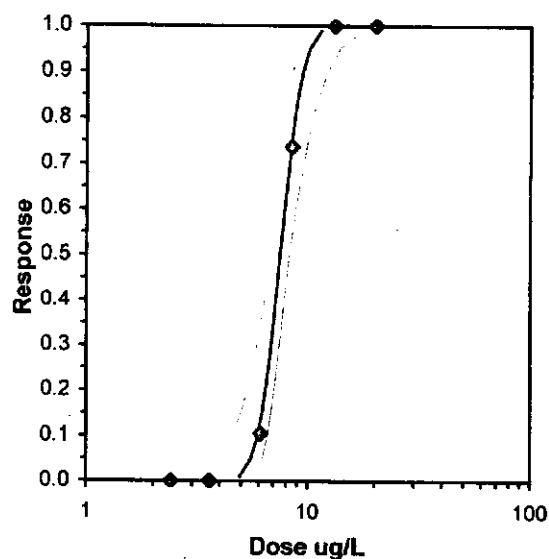
Auxiliary Tests

	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.01$)	0.89149	0.868	0.22288	1.92194
Equality of variance cannot be confirmed				

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	12.8698	3.27838	6.44416	19.2954	0.05	0.70272	9.48773	0.95	0.87182	0.0777	3
Intercept	-6.2201	2.86612	-11.838	-0.6025							
TSCR	0.01674	0.01657	-0.0157	0.04921							

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	4.90974	3.18508	5.73551
EC05	3.355	5.5464	4.03831	6.25988
EC10	3.718	5.91889	4.57303	6.57304
EC15	3.964	6.18424	4.96534	6.80397
EC20	4.158	6.40359	5.29339	7.00332
EC25	4.326	6.59796	5.58393	7.18945
EC40	4.747	7.11432	6.32747	7.75503
EC50	5.000	7.44421	6.75391	8.19791
EC60	5.253	7.7894	7.14332	8.74585
EC75	5.674	8.399	7.70987	9.90453
EC80	5.842	8.65394	7.91589	10.4467
EC85	6.036	8.96089	8.14878	11.1356
EC90	6.282	9.36261	8.43593	12.0896
EC95	6.645	9.99139	8.85876	13.6892
EC99	7.326	11.287	9.66948	17.3548



SHEALY CONSULTING, LLC.

WER / BIOASSAY DATA FORM

FACILITY: <u>McKenney</u>	TEST: SIMULATED STREAM
EFFLUENT ID: <u>A 398</u>	<u>Collected 3-29-11 1250</u>
REC. STREAM ID: <u>N/A</u>	
SIMULATED STREAM MIX: <u>100% Effluent</u>	
LAB DILUTION WATER: <u>EPA 0601</u>	
TEST HARDNESS: <u>94 mg/L</u>	
PRETREATMENT: <u>N/A</u>	
SUBSTOCK: <u>1.5 mg CuSO₄ · 5H₂O / L Simstream (= 1 mg/L Cu)</u>	

Test Species: <u>C. dubia</u>	Test Start Date/Time: <u>3-30-11 1400</u>
Age: <u><24h</u>	Analyst Initials @ Start: <u>EWT</u>
Source/Neonate ID: <u>SC299</u>	24 hour Reading Time: <u>1400</u>
Incubator #: <u>2</u>	Analyst Initials @ 24 hours: <u>EWT</u>
Board #: <u>SS</u>	Test End Date/Time: <u>4-1-11 1400</u>
Thermometer #: <u>7679</u>	Analyst Initials @ End: <u>EWT</u>

WATER CHEMISTRY DATA

Treatment	Temp. (°C)	D.O. (mg/l)	pH (SU)	Temp. (°C)	D.O. (mg/l)	pH (SU)	Temp. (°C)	D.O. (mg/l)	pH (SU)
% Substock	0 Hrs.	0 Hrs.	0 Hrs.	24 Hrs.	24 Hrs.	24 Hrs.	48 Hrs.	48 Hrs.	48 Hrs.
lab control	24.2	8.16	7.90	25.8	7.79	8.10	24.6	8.56	8.11
Simstream	24.0	8.18	7.34	25.6	7.81	8.01	24.6	8.56	8.06
2.1%	24.1	8.14	7.41	25.6	7.85	8.00	25.0	8.55	8.06
3.2%	24.1	8.16	7.39	25.6	7.85	7.99	24.8	8.55	8.06
4.9%	24.1	8.17	7.38	25.7	7.81	7.98	25.1	8.58	8.06
7.5%	24.1	8.17	7.38	25.5	7.78	8.00	25.3	8.53	8.06
11.6%	24.2	8.18	7.38	25.3	7.68	7.99	25.3	8.50	8.06
17.9%	24.2	8.18	7.38	25.5	7.68	7.97	25.1	8.51	8.05
27.5%	24.1	8.10	7.37	25.8	7.74	7.97	25.2	8.55	8.05

Surrogate cups contain 5 organisms at test initiation. DO meter 06E1533 pH meter 1318724

TOTAL METAL LC50 = 86.05 ug/L DISSOLVED METAL LC50 = 76.02 ug/L

MORTALITY DATA: *McKenney Simstream* 3-30-11

Concentration % Substock	Concentration µg/L Cu Tot. / Diss.	Final µg/L Cu (Dissolved)	Rep.	# Dead 24 Hours	# Dead 48 Hours	% Mortality 48 Hours
✓ Lab Control	<1 / <1	<1	A	0	0	10%
			B	0	0	
			C	0	2	
			D	0	0	
Simstream	18 / 18	14	A	0	0	0%
			B	0	0	
			C	0	0	
			D	0	0	
2.1% 15	35 / 27	-	A	0	0	0%
			B	0	0	
			C	0	0	
			D	0	0	
✓ 3.2% 25	48 / 46	40	A	0	0	0%
			B	0	0	
			C	0	0	
			D	0	0	
✓ 4.9% 35	66 / 58	51	A	0	0	5%
			B	0	0	
			C	0	1	
			D	0	0	
7.5% 45	94 / 83	77	A	3	5	70%
			B	2	2	
			C	3	4	
			D	2	3	
11.6% 55	130 / 120	110	A	5	/	100%
			B	5		
			C	5		
			D	5		
17.9% 65	190 / 160	-	A	5	/	100%
			B	5		
			C	5		
			D	5		
27.5% 75	280 / 250	-	A	5	/	100%
			B	5		
			C	5		
			D	5		
			A			
			B			
			C			
			D			
			A			
			B			
			C			
			D			

Daphnid Acute Test-48 Hr Survival

Start Date: 3/30/2011 Test ID: MCK2SSTC Sample ID:
End Date: 4/1/2011 Lab ID: SCLLC Sample Type: CUSO-Copper sulfate
Sample Date: Protocol: EPAAW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
Comments:

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
35	1.0000	1.0000	1.0000	1.0000
48	1.0000	1.0000	1.0000	1.0000
66	1.0000	1.0000	0.8000	1.0000
94	0.0000	0.6000	0.2000	0.4000
130	0.0000	0.0000	0.0000	0.0000
190	0.0000	0.0000	0.0000	0.0000
280	0.0000	0.0000	0.0000	0.0000

Conc-ug/L	Mean	N-Mean	Transform: Arcsin Square Root					N	Number Resp	Total Number
			Mean	Min	Max	CV%				
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20	
35	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20	
48	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20	
66	0.9500	0.9500	1.2857	1.1071	1.3453	9.261	4	1	20	
94	0.3000	0.3000	0.5650	0.2255	0.8861	50.368	4	14	20	
130	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20	
190	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20	
280	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20	

Auxiliary Tests

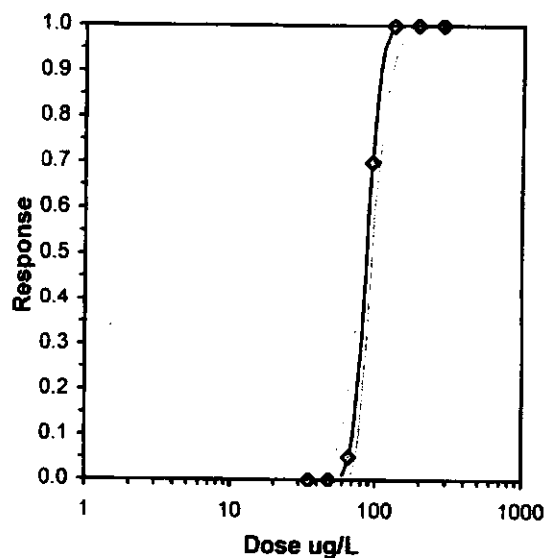
	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.01$)	0.78112	0.868	-0.3305	4.54899
Equality of variance cannot be confirmed				

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	14.749	3.21844	8.44089	21.0572	0	0.1178	11.0705	1	1.93477	0.0678	3
Intercept	-23.536	6.24714	-35.78	-11.292							

TSCR

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	59.8463	44.4753	68.1094
EC05	3.355	66.5646	53.2418	73.8201
EC10	3.718	70.4491	58.4914	77.202
EC15	3.964	73.1973	62.2439	79.6718
EC20	4.158	75.4577	65.328	81.7773
EC25	4.326	77.4524	68.0274	83.7116
EC40	4.747	82.7159	74.891	89.3167
EC50	5.000	86.053	78.9096	93.3852
EC60	5.253	89.5248	82.7297	98.1279
EC75	5.674	95.6087	88.5816	107.647
EC80	5.842	98.1361	90.765	111.987
EC85	6.036	101.167	93.2454	117.432
EC90	6.282	105.113	96.3056	124.866
EC95	6.645	111.247	100.796	137.071
EC99	7.326	123.736	109.331	163.964



Daphnid Acute Test-48 Hr Survival

Start Date: 3/30/2011 Test ID: MCK2SSDC Sample ID:
End Date: 4/1/2011 Lab ID: SCLLC Sample Type: CUSO-Copper sulfate
Sample Date: Protocol: EPAAW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
Comments:

Conc-ug/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
27	1.0000	1.0000	1.0000	1.0000
46	1.0000	1.0000	1.0000	1.0000
58	1.0000	1.0000	0.8000	1.0000
83	0.0000	0.6000	0.2000	0.4000
120	0.0000	0.0000	0.0000	0.0000
160	0.0000	0.0000	0.0000	0.0000
250	0.0000	0.0000	0.0000	0.0000

Conc-ug/L	Mean	N-Mean	Transform: Arcsin Square Root					Number Resp	Total Number
			Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
27	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
46	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
58	0.9500	0.9500	1.2857	1.1071	1.3453	9.261	4	1	20
83	0.3000	0.3000	0.5650	0.2255	0.8861	50.368	4	14	20
120	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
160	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
250	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

Auxiliary Tests

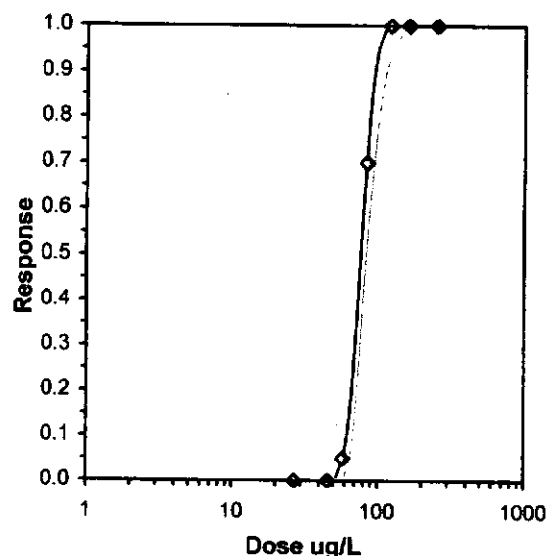
	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.01$)	0.78112	0.868	-0.3305	4.54899
Equality of variance cannot be confirmed				

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	14.4441	3.1661	8.23853	20.6496	0	0.07893	11.0705	1	1.88093	0.06923	3
Intercept	-22.168	5.95767	-33.845	-10.491							

TSCR

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	52.4653	39.0216	59.6918
EC05	3.355	58.4862	46.9001	64.829
EC10	3.718	61.9735	51.6209	67.8904
EC15	3.964	64.443	54.9915	70.1393
EC20	4.158	66.4757	57.7559	72.0678
EC25	4.326	68.2707	60.1685	73.8497
EC40	4.747	73.0114	66.2569	79.068
EC50	5.000	76.0205	69.7843	82.8885
EC60	5.253	79.1536	73.1195	87.3452
EC75	5.674	84.6501	78.2354	96.2459
EC80	5.842	86.9357	80.1556	100.284
EC85	6.036	89.678	82.3463	105.342
EC90	6.282	93.2515	85.0617	112.237
EC95	6.645	98.8117	89.0659	123.552
EC99	7.326	110.151	96.7177	148.518



SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC

603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **McKenney WER 2**

Lot Number: **MC30042**

Date Completed: **04/05/2011**



Grant Wilton
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MC30042

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Shealy is not NELAC certified for Phosphorus by 365.1 but is certified in SC and NC.

Shealy is not NELAC certified for VPH, but is certified for VPH in NC.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MC30042

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Effluent	Aqueous	03/29/2011 1248	03/30/2011
(1 sample)				

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MC30042

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	Effluent	Aqueous	BOD, 5 day	SM 5210B	15		mg/L	5
(1 detection)								

Inorganic non-metals

Client: **Shealy Consulting LLC**

Laboratory ID: **MC30042-001**

Description: **Effluent**

Matrix: **Aqueous**

Date Sampled: **03/29/2011 1248**

Date Received: **03/30/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(BOD, 5 day) SM 5210B	1	04/05/2011 0818	ARW	03/31/2011 0821	6276

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
BOD, 5 day		SM 5210B	15		2.0	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 5 of 5
Level 1 Report v2.1

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC
603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **McKenney WER 2**

Lot Number: **MD04017**
Date Completed: **04/14/2011**



Grant Wilton
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MD04017

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Shealy is not NELAC certified for Phosphorus by 365.1 but is certified in SC and NC.

Shealy is not NELAC certified for VPH, but is certified for VPH in NC.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MD04017

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Labwater	Aqueous	03/30/2011 1250	04/04/2011
002	Effluent	Aqueous	03/30/2011 1248	04/04/2011

(2 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MD04017

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	Labwater	Aqueous	Alkalinity	SM 2320B	53		mg/L	5
001	Labwater	Aqueous	DOC	5310C	3.2		mg/L	5
001	Labwater	Aqueous	Hardness (total)	SM 2340C	84		mg/L	5
001	Labwater	Aqueous	Specific Conductance	120.1	259		umhos/	5
001	Labwater	Aqueous	Dissolved Calcium	200.8	13000		ug/L	6
001	Labwater	Aqueous	Dissolved Iron	200.8	34		ug/L	6
001	Labwater	Aqueous	Dissolved Magnesium	200.8	11000		ug/L	6
001	Labwater	Aqueous	Dissolved Potassium	200.8	7900		ug/L	6
001	Labwater	Aqueous	Dissolved Selenium	200.8	1.8		ug/L	6
001	Labwater	Aqueous	Dissolved Sodium	200.8	26000		ug/L	6
001	Labwater	Aqueous	Calcium	200.8	13000		ug/L	7
001	Labwater	Aqueous	Magnesium	200.8	11000		ug/L	7
001	Labwater	Aqueous	Potassium	200.8	7500		ug/L	7
001	Labwater	Aqueous	Selenium	200.8	1.7		ug/L	7
001	Labwater	Aqueous	Sodium	200.8	26000		ug/L	7
002	Effluent	Aqueous	Alkalinity	SM 2320B	52		mg/L	8
002	Effluent	Aqueous	Ammonia - N (phenate)	350.1	0.38		mg/L	8
002	Effluent	Aqueous	DOC	5310C	7.8		mg/L	8
002	Effluent	Aqueous	Hardness (total)	SM 2340C	94		mg/L	8
002	Effluent	Aqueous	Specific Conductance	120.1	383		umhos/	8
002	Effluent	Aqueous	TOC	SM 5310C	5.0		mg/L	8
002	Effluent	Aqueous	TSS	SM 2540D	2.7		mg/L	8
002	Effluent	Aqueous	Dissolved Barium	200.8	14		ug/L	9
002	Effluent	Aqueous	Dissolved Calcium	200.8	23000		ug/L	9
002	Effluent	Aqueous	Dissolved Copper	200.8	10		ug/L	9
002	Effluent	Aqueous	Dissolved Iron	200.8	78		ug/L	9
002	Effluent	Aqueous	Dissolved Magnesium	200.8	5200		ug/L	9
002	Effluent	Aqueous	Dissolved Manganese	200.8	27		ug/L	9
002	Effluent	Aqueous	Dissolved Potassium	200.8	12000		ug/L	9
002	Effluent	Aqueous	Dissolved Silicon	200.8	14000		ug/L	9
002	Effluent	Aqueous	Dissolved Sodium	200.8	36000		ug/L	9
002	Effluent	Aqueous	Dissolved Zinc	200.8	15		ug/L	9
002	Effluent	Aqueous	Aluminum	200.8	56		ug/L	10
002	Effluent	Aqueous	Barium	200.8	15		ug/L	10
002	Effluent	Aqueous	Calcium	200.8	25000		ug/L	10
002	Effluent	Aqueous	Copper	200.8	13		ug/L	10
002	Effluent	Aqueous	Iron	200.8	130		ug/L	10
002	Effluent	Aqueous	Magnesium	200.8	5200		ug/L	10
002	Effluent	Aqueous	Manganese	200.8	29		ug/L	10
002	Effluent	Aqueous	Potassium	200.8	13000		ug/L	10
002	Effluent	Aqueous	Silicon	200.8	14000		ug/L	10
002	Effluent	Aqueous	Sodium	200.8	37000		ug/L	10
002	Effluent	Aqueous	Zinc	200.8	17		ug/L	10

(43 detections)

Inorganic non-metals

Client: **Shealy Consulting LLC**

Laboratory ID: **MD04017-001**

Description: **Labwater**

Matrix: **Aqueous**

Date Sampled: **03/30/2011 1250**

Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	04/10/2011 1548	HBB		57103
1	SM4500-NH3	(Ammonia - N) 350.1	1	04/07/2011 1558	SMH	04/06/2011 1641	56803
1		(DOC) 5310C	1	04/14/2011 1439	DAS		57462
1		(Hardness (to) SM	1	04/11/2011 1533	HBB		57161
1		(Specific Con) 120.1	1	04/10/2011 1538	HBB		57104
1		(TOC) SM 5310C	1	04/08/2011 0059	DAS		56929
1		(TSS) SM 2540D	1	04/05/2011 1248	MML		56683

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Alkalinity		SM 2320B	53		10	mg/L	1
Ammonia - N (phenate)		350.1	ND		0.10	mg/L	1
DOC		5310C	3.2		1.0	mg/L	1
Hardness (total)		SM 2340C	84		10	mg/L	1
Specific Conductance		120.1	259		2.00	umhos/cm	1
TOC		SM 5310C	ND		1.0	mg/L	1
TSS		SM 2540D	ND		1.0	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 5 of 10

Level 1 Report v2.1

ICP-MS

Client: **Shealy Consulting LLC**Laboratory ID: **MD04017-001**Description: **Labwater**Matrix: **Aqueous**Date Sampled: **03/30/2011 1250**Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1305	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Aluminum	7429-90-5	200.8	ND		40	ug/L	1
Dissolved Antimony	7440-36-0	200.8	ND		1.0	ug/L	1
Dissolved Arsenic	7440-38-2	200.8	ND		1.0	ug/L	1
Dissolved Barium	7440-39-3	200.8	ND		5.0	ug/L	1
Dissolved Beryllium	7440-41-7	200.8	ND		0.40	ug/L	1
Dissolved Cadmium	7440-43-9	200.8	ND		0.10	ug/L	1
Dissolved Calcium	7440-70-2	200.8	13000		200	ug/L	1
Dissolved Chromium	7440-47-3	200.8	ND		5.0	ug/L	1
Dissolved Cobalt	7440-48-4	200.8	ND		5.0	ug/L	1
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1
Dissolved Iron	7439-89-6	200.8	34		20	ug/L	1
Dissolved Lead	7439-92-1	200.8	ND		1.0	ug/L	1
Dissolved Magnesium	7439-95-4	200.8	11000		50	ug/L	1
Dissolved Manganese	7439-96-5	200.8	ND		5.0	ug/L	1
Dissolved Nickel	7440-02-0	200.8	ND		5.0	ug/L	1
Dissolved Potassium	7440-09-7	200.8	7900		200	ug/L	1
Dissolved Selenium	7782-49-2	200.8	1.8		1.0	ug/L	1
Dissolved Silicon	7440-21-3	200.8	ND		100	ug/L	1
Dissolved Silver	7440-22-4	200.8	ND		1.0	ug/L	1
Dissolved Sodium	7440-23-5	200.8	26000		200	ug/L	1
Dissolved Thallium	7440-28-0	200.8	ND		0.50	ug/L	1
Dissolved Vanadium	7440-62-2	200.8	ND		5.0	ug/L	1
Dissolved Zinc	7440-66-6	200.8	ND		10	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 10
Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04017-001

Description: Labwater

Matrix: Aqueous

Date Sampled: 03/30/2011 1250

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0416	KJC	04/04/2011 1726	56597
2	200.2	200.8	1	04/06/2011 2247	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Aluminum	7429-90-5	200.8	ND		40	ug/L	1
Antimony	7440-36-0	200.8	ND		1.0	ug/L	1
Arsenic	7440-38-2	200.8	ND		1.0	ug/L	1
Barium	7440-39-3	200.8	ND		5.0	ug/L	1
Beryllium	7440-41-7	200.8	ND		0.40	ug/L	1
Cadmium	7440-43-9	200.8	ND		0.10	ug/L	1
Calcium	7440-70-2	200.8	13000		200	ug/L	1
Chromium	7440-47-3	200.8	ND		5.0	ug/L	1
Cobalt	7440-48-4	200.8	ND		5.0	ug/L	1
Copper	7440-50-8	200.8	ND		1.0	ug/L	1
Iron	7439-89-6	200.8	ND		20	ug/L	1
Lead	7439-92-1	200.8	ND		1.0	ug/L	1
Magnesium	7439-95-4	200.8	11000		50	ug/L	1
Manganese	7439-96-5	200.8	ND		5.0	ug/L	1
Nickel	7440-02-0	200.8	ND		5.0	ug/L	1
Potassium	7440-09-7	200.8	7500		200	ug/L	1
Selenium	7782-49-2	200.8	1.7		1.0	ug/L	2
Silicon	7440-21-3	200.8	ND		100	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	ug/L	1
Sodium	7440-23-5	200.8	26000		200	ug/L	1
Thallium	7440-28-0	200.8	ND		0.50	ug/L	1
Vanadium	7440-62-2	200.8	ND		5.0	ug/L	1
Zinc	7440-66-6	200.8	ND		10	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 7 of 10

Level 1 Report v2.1

Inorganic non-metals

Client: Shealy Consulting LLC

Laboratory ID: MD04017-002

Description: Effluent

Matrix: Aqueous

Date Sampled: 03/30/2011 1248

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	04/10/2011 1559	HBB		57103
1	SM4500-NH3	(Ammonia - N) 350.1	1	04/07/2011 1558	SMH	04/06/2011 1641	56803
1		(DOC) 5310C	1	04/14/2011 1534	DAS		57462
1		(Hardness (to) SM	1	04/11/2011 1541	HBB		57161
1		(Specific Con) 120.1	1	04/10/2011 1550	HBB		57104
1		(TOC) SM 5310C	1	04/08/2011 0116	DAS		56929
1		(TSS) SM 2540D	1	04/05/2011 1248	MML		56683

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Alkalinity		SM 2320B	52		10	mg/L	1
Ammonia - N (phenate)		350.1	0.38		0.10	mg/L	1
DOC		5310C	7.8		1.0	mg/L	1
Hardness (total)		SM 2340C	94		10	mg/L	1
Specific Conductance		120.1	383		2.00	umhos/cm	1
TOC		SM 5310C	5.0		1.0	mg/L	1
TSS		SM 2540D	2.7		1.0	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 8 of 10

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04017-002

Description: Effluent

Matrix: Aqueous

Date Sampled: 03/30/2011 1248

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 2357	KJC	04/06/2011 1015	56737
2	200.2	200.8	5	04/08/2011 0134	KJC	04/06/2011 1015	56737

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Aluminum	7429-90-5	200.8	ND		40	ug/L	1
Dissolved Antimony	7440-36-0	200.8	ND		1.0	ug/L	1
Dissolved Arsenic	7440-38-2	200.8	ND		1.0	ug/L	1
Dissolved Barium	7440-39-3	200.8	14		5.0	ug/L	1
Dissolved Beryllium	7440-41-7	200.8	ND		0.40	ug/L	1
Dissolved Cadmium	7440-43-9	200.8	ND		0.10	ug/L	1
Dissolved Calcium	7440-70-2	200.8	23000		200	ug/L	1
Dissolved Chromium	7440-47-3	200.8	ND		5.0	ug/L	1
Dissolved Cobalt	7440-48-4	200.8	ND		5.0	ug/L	1
Dissolved Copper	7440-50-8	200.8	10		1.0	ug/L	1
Dissolved Iron	7439-89-6	200.8	78		20	ug/L	1
Dissolved Lead	7439-92-1	200.8	ND		1.0	ug/L	1
Dissolved Magnesium	7439-95-4	200.8	5200		50	ug/L	1
Dissolved Manganese	7439-96-5	200.8	27		5.0	ug/L	1
Dissolved Nickel	7440-02-0	200.8	ND		5.0	ug/L	1
Dissolved Potassium	7440-09-7	200.8	12000		200	ug/L	1
Dissolved Selenium	7782-49-2	200.8	ND		1.0	ug/L	1
Dissolved Silicon	7440-21-3	200.8	14000		500	ug/L	2
Dissolved Silver	7440-22-4	200.8	ND		1.0	ug/L	1
Dissolved Sodium	7440-23-5	200.8	36000		200	ug/L	1
Dissolved Thallium	7440-28-0	200.8	ND		0.50	ug/L	1
Dissolved Vanadium	7440-62-2	200.8	ND		5.0	ug/L	1
Dissolved Zinc	7440-66-6	200.8	15		10	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 9 of 10

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04017-002

Description: Effluent

Matrix: Aqueous

Date Sampled: 03/30/2011 1248

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 2349	KJC	04/06/2011 1015	56737
2	200.2	200.8	5	04/08/2011 0126	KJC	04/06/2011 1015	56737

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Aluminum	7429-90-5	200.8	56		40	ug/L	1
Antimony	7440-36-0	200.8	ND		1.0	ug/L	1
Arsenic	7440-38-2	200.8	ND		1.0	ug/L	1
Barium	7440-39-3	200.8	15		5.0	ug/L	1
Beryllium	7440-41-7	200.8	ND		0.40	ug/L	1
Cadmium	7440-43-9	200.8	ND		0.10	ug/L	1
Calcium	7440-70-2	200.8	25000		200	ug/L	1
Chromium	7440-47-3	200.8	ND		5.0	ug/L	1
Cobalt	7440-48-4	200.8	ND		5.0	ug/L	1
Copper	7440-50-8	200.8	13		1.0	ug/L	1
Iron	7439-89-6	200.8	130		20	ug/L	1
Lead	7439-92-1	200.8	ND		1.0	ug/L	1
Magnesium	7439-95-4	200.8	5200		50	ug/L	1
Manganese	7439-96-5	200.8	29		5.0	ug/L	1
Nickel	7440-02-0	200.8	ND		5.0	ug/L	1
Potassium	7440-09-7	200.8	13000		200	ug/L	1
Selenium	7782-49-2	200.8	ND		1.0	ug/L	1
Silicon	7440-21-3	200.8	14000		500	ug/L	2
Silver	7440-22-4	200.8	ND		1.0	ug/L	1
Sodium	7440-23-5	200.8	37000		200	ug/L	1
Thallium	7440-28-0	200.8	ND		0.50	ug/L	1
Vanadium	7440-62-2	200.8	ND		5.0	ug/L	1
Zinc	7440-66-6	200.8	17		10	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 10 of 10

Level 1 Report v2.1

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC
603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **McKenney Blanks**

Lot Number: **MD04015**
Date Completed: **04/06/2011**



Grant Wilton
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MD04015

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Shealy is not NELAC certified for Phosphorus by 365.1 but is certified in SC and NC.

Shealy is not NELAC certified for VPH, but is certified for VPH in NC.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MD04015

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Compositor Blank	Aqueous	03/28/2011 1245	04/04/2011
002	Filtration Blank	Aqueous	03/29/2011 1300	04/04/2011
003	SS Carboy Blank	Aqueous	03/30/2011 0930	04/04/2011
004	LW Cylinder Blank	Aqueous	03/30/2011 0930	04/04/2011
005	SS Cylinder Blank	Aqueous	03/30/2011 0930	04/04/2011
006	Test Cup Blank	Aqueous	03/30/2011 0940	04/04/2011

(6 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MD04015

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
(0 detections)								

ICP-MS

Client: **Shealy Consulting LLC**Laboratory ID: **MD04015-001**Description: **Compositor Blank**Matrix: **Aqueous**Date Sampled: **03/28/2011 1245**Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0155	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 5 of 10

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC				Laboratory ID: MD04015-002			
Description: Filtration Blank				Matrix: Aqueous			
Date Sampled: 03/29/2011 1300							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0211	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 10

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC				Laboratory ID: MD04015-003			
Description: SS Carboy Blank				Matrix: Aqueous			
Date Sampled: 03/30/2011 0930							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0218	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 7 of 10
Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04015-004

Description: LW Cylinder Blank

Matrix: Aqueous

Date Sampled: 03/30/2011 0930

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0226	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 8 of 10

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04015-005

Description: SS Cylinder Blank

Matrix: Aqueous

Date Sampled: 03/30/2011 0930

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0234	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 9 of 10

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04015-006

Description: Test Cup Blank

Matrix: Aqueous

Date Sampled: 03/30/2011 0940

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0242	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 10 of 10

Level 1 Report v2.1

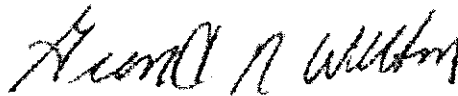
SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC
603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **McKenney LW2**

Lot Number: **MD04012**
Date Completed: **04/06/2011**



Grant Wilton
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MD04012

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Shealy is not NELAC certified for Phosphorus by 365.1 but is certified in SC and NC.

Shealy is not NELAC certified for VPH, but is certified for VPH in NC.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MD04012

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Lab Control	Aqueous	03/30/2011 1213	04/04/2011
002	0.25	Aqueous	03/30/2011 1215	04/04/2011
003	0.39	Aqueous	03/30/2011 1216	04/04/2011
004	0.60	Aqueous	03/30/2011 1218	04/04/2011
005	0.91	Aqueous	03/30/2011 1219	04/04/2011
006	1.4	Aqueous	03/30/2011 1221	04/04/2011
007	2.1	Aqueous	03/30/2011 1233	04/04/2011
008	Filter Blank	Aqueous	03/30/2011 1210	04/04/2011

(8 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MD04012

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	0.25	Aqueous	Dissolved Copper	200.8	2.4		ug/L	7
002	0.25	Aqueous	Copper	200.8	2.5		ug/L	8
003	0.39	Aqueous	Dissolved Copper	200.8	3.6		ug/L	9
003	0.39	Aqueous	Copper	200.8	3.8		ug/L	10
004	0.60	Aqueous	Dissolved Copper	200.8	6.1		ug/L	11
004	0.60	Aqueous	Copper	200.8	6.6		ug/L	12
005	0.91	Aqueous	Dissolved Copper	200.8	8.4		ug/L	13
005	0.91	Aqueous	Copper	200.8	9.4		ug/L	14
006	1.4	Aqueous	Dissolved Copper	200.8	13		ug/L	15
006	1.4	Aqueous	Copper	200.8	14		ug/L	16
007	2.1	Aqueous	Dissolved Copper	200.8	20		ug/L	17
007	2.1	Aqueous	Copper	200.8	19		ug/L	18

(12 detections)

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04012-001

Description: Lab Control

Matrix: Aqueous

Date Sampled: 03/30/2011 1213

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1123	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 5 of 19

Level 1 Report v2.1

ICP-MS

Client: **Shealy Consulting LLC**Laboratory ID: **MD04012-001**Description: **Lab Control**Matrix: **Aqueous**Date Sampled: **03/30/2011 1213**Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1116	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 19

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC				Laboratory ID: MD04012-002			
Description: 0.25				Matrix: Aqueous			
Date Sampled: 03/30/2011 1215							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1139	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	2.4		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 7 of 19

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC				Laboratory ID: MD04012-002			
Description: 0.25				Matrix: Aqueous			
Date Sampled: 03/30/2011 1215							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch		
1	200.2	200.8	1	04/05/2011 1131	KJC	04/04/2011 1726	56596		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	2.5		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04012-003

Description: 0.39

Matrix: Aqueous

Date Sampled: 03/30/2011 1216

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1155	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	3.6		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 9 of 19

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC				Laboratory ID: MD04012-003			
Description: 0.39				Matrix: Aqueous			
Date Sampled: 03/30/2011 1216							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1147	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	3.8		1.0	ug/L	1

PQL = Practical quantitation limit	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the PQL	J = Estimated result < PQL and ≥ MDL	P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"	N = Recovery is out of criteria	H = Out of holding time

ICP-MS

Client: Shealy Consulting LLC				Laboratory ID: MD04012-004			
Description: 0.60				Matrix: Aqueous			
Date Sampled: 03/30/2011 1218							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1218	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	6.1		1.0	ug/L	1

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

H = Out of holding time

ICP-MS

Client: Shealy Consulting LLC				Laboratory ID: MD04012-004			
Description: 0.60				Matrix: Aqueous			
Date Sampled: 03/30/2011 1218							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1226	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	6.6		1.0	ug/L	1

PQL = Practical quantitation limit
 ND = Not detected at or above the PQL
 Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

B = Detected in the method blank
 J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range
 P = The RPD between two GC columns exceeds 40%
 N = Recovery is out of criteria
 H = Out of holding time

ICP-MS

Client: Shealy Consulting LLC				Laboratory ID: MD04012-005			
Description: 0.91				Matrix: Aqueous			
Date Sampled: 03/30/2011 1219							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch		
1	200.2	200.8	1	04/05/2011 1242	KJC	04/04/2011 1726	56596		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	8.4		1.0	ug/L	1

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

B = Detected in the method blank

J = Estimated result < PQL and ≥ MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

H = Out of holding time

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04012-005

Description: 0.91

Matrix: Aqueous

Date Sampled: 03/30/2011 1219

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1234	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	9.4		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 14 of 19

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04012-006

Description: 1.4

Matrix: Aqueous

Date Sampled: 03/30/2011 1221

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/05/2011 1258	KJC	04/04/2011 1726	56596

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	13		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 15 of 19

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC				Laboratory ID: MD04012-006			
Description: 1.4				Matrix: Aqueous			
Date Sampled: 03/30/2011 1221							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch		
1	200.2	200.8	1	04/05/2011 1250	KJC	04/04/2011 1726	56596		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	14		1.0	ug/L	1

PQL = Practical quantitation limit	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the PQL	J = Estimated result < PQL and ≥ MDL	P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"	N = Recovery is out of criteria	H = Out of holding time

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04012-007

Description: 2.1

Matrix: Aqueous

Date Sampled: 03/30/2011 1233

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0123	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	20		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 17 of 19

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04012-007

Description: 2.1

Matrix: Aqueous

Date Sampled: 03/30/2011 1233

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0116	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.8	19		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 18 of 19

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04012-008

Description: Filter Blank

Matrix: Aqueous

Date Sampled: 03/30/2011 1210

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0131	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysts are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 19 of 19

Level 1 Report v2.1

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC
603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **McKenney SS2**

Lot Number: **MD04011**
Date Completed: **04/07/2011**



Grant Wilton
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MD04011

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Shealy is not NELAC certified for Phosphorus by 365.1 but is certified in SC and NC.

Shealy is not NELAC certified for VPH, but is certified for VPH in NC.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MD04011

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	Simstream	Aqueous	03/30/2011 1230	04/04/2011
002	2.1 %	Aqueous	03/30/2011 1231	04/04/2011
003	3.2	Aqueous	03/30/2011 1233	04/04/2011
004	4.9	Aqueous	03/30/2011 1234	04/04/2011
005	7.5	Aqueous	03/30/2011 1236	04/04/2011
006	11.6	Aqueous	03/30/2011 1237	04/04/2011
007	17.9	Aqueous	03/30/2011 1239	04/04/2011
008	27.5	Aqueous	03/30/2011 1241	04/04/2011
009	Filter Blank	Aqueous	03/30/2011 1228	04/04/2011

(9 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MD04011

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	Simstream	Aqueous	Dissolved Copper	200.7	0.018		mg/L	5
001	Simstream	Aqueous	Copper	200.7	0.018		mg/L	6
002	2.1 %	Aqueous	Dissolved Copper	200.7	0.027		mg/L	7
002	2.1 %	Aqueous	Copper	200.7	0.035		mg/L	8
003	3.2	Aqueous	Dissolved Copper	200.7	0.046		mg/L	9
003	3.2	Aqueous	Copper	200.7	0.048		mg/L	10
004	4.9	Aqueous	Dissolved Copper	200.7	0.058		mg/L	11
004	4.9	Aqueous	Copper	200.7	0.066		mg/L	12
005	7.5	Aqueous	Dissolved Copper	200.7	0.083		mg/L	13
005	7.5	Aqueous	Copper	200.7	0.094		mg/L	14
006	11.6	Aqueous	Dissolved Copper	200.7	0.12		mg/L	15
006	11.6	Aqueous	Copper	200.7	0.13		mg/L	16
007	17.9	Aqueous	Dissolved Copper	200.7	0.16		mg/L	17
007	17.9	Aqueous	Copper	200.7	0.19		mg/L	18
008	27.5	Aqueous	Dissolved Copper	200.7	0.25		mg/L	19
008	27.5	Aqueous	Copper	200.7	0.28		mg/L	20

(16 detections)

ICP-AES

Client: **Shealy Consulting LLC**

Laboratory ID: **MD04011-001**

Description: **Simstream**

Matrix: **Aqueous**

Date Sampled: **03/30/2011 1230**

Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0454	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.018		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 5 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-001

Description: Simstream

Matrix: Aqueous

Date Sampled: 03/30/2011 1230

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0448	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.018		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-002

Description: 2.1 %

Matrix: Aqueous

Date Sampled: 03/30/2011 1231

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0506	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.027		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 7 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC				Laboratory ID: MD04011-002			
Description: 2.1 %				Matrix: Aqueous			
Date Sampled: 03/30/2011 1231							
Date Received: 04/04/2011							

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0500	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.035		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 8 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-003

Description: 3.2

Matrix: Aqueous

Date Sampled: 03/30/2011 1233

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0518	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.046		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 9 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-003

Description: 3.2

Matrix: Aqueous

Date Sampled: 03/30/2011 1233

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0512	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.048		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 10 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC	Laboratory ID: MD04011-004
Description: 4.9	Matrix: Aqueous
Date Sampled: 03/30/2011 1234	
Date Received: 04/04/2011	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0530	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.058		0.0050	mg/L	1

PQL = Practical quantitation limit	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the PQL	J = Estimated result < PQL and ≥ MDL	P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"	N = Recovery is out of criteria	H = Out of holding time

ICP-AES

Client: **Shealy Consulting LLC**Laboratory ID: **MD04011-004**Description: **4.9**Matrix: **Aqueous**Date Sampled: **03/30/2011 1234**Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0524	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.066		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 12 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-005

Description: 7.5

Matrix: Aqueous

Date Sampled: 03/30/2011 1236

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch		
1	200.7	200.7	1	04/07/2011 0542	KJC	04/04/2011 1958	56610		

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.083		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 13 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-005

Description: 7.5

Matrix: Aqueous

Date Sampled: 03/30/2011 1236

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0536	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.094		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 14 of 21

Level 1 Report v2.1

ICP-AES

Client: **Shealy Consulting LLC**Laboratory ID: **MD04011-006**Description: **11.6**Matrix: **Aqueous**Date Sampled: **03/30/2011 1237**Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0606	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.12		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 15 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-006

Description: 11.6

Matrix: Aqueous

Date Sampled: 03/30/2011 1237

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0600	KJC	04/04/2011 1958	56610

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.13		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 16 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-007

Description: 17.9

Matrix: Aqueous

Date Sampled: 03/30/2011 1239

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0647	KJC	04/04/2011 1958	56611

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.16		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 17 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-007

Description: 17.9

Matrix: Aqueous

Date Sampled: 03/30/2011 1239

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0641	KJC	04/04/2011 1958	56611

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.19		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 18 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-008

Description: 27.5

Matrix: Aqueous

Date Sampled: 03/30/2011 1241

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0659	KJC	04/04/2011 1958	56611

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.25		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 19 of 21

Level 1 Report v2.1

ICP-AES

Client: Shealy Consulting LLC	Laboratory ID: MD04011-008
Description: 27.5	Matrix: Aqueous
Date Sampled: 03/30/2011 1241	
Date Received: 04/04/2011	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0653	KJC	04/04/2011 1958	56611

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Copper	7440-50-8	200.7	0.28		0.0050	mg/L	1

PQL = Practical quantitation limit

ND = Not detected at or above the PQL

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

B = Detected in the method blank

J = Estimated result < PQL and \geq MDL

E = Quantitation of compound exceeded the calibration range

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

H = Out of holding time

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04011-009

Description: Filter Blank

Matrix: Aqueous

Date Sampled: 03/30/2011 1228

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0705	KJC	04/04/2011 1958	56611

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	ND		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 21 of 21

Level 1 Report v2.1

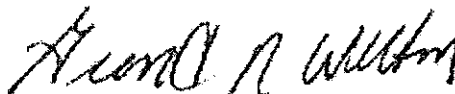
SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Shealy Consulting LLC
603 S. Lake Dr.
Lexington, SC 29072
Attention: Laura Shealy

Project Name: **Mckenney Finals**

Lot Number: **MD04016**
Date Completed: **04/07/2011**



Grant Wilton
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

• • • • •

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative Shealy Consulting LLC Lot Number: MD04016

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Shealy is not NELAC certified for Phosphorus by 365.1 but is certified in SC and NC.

Shealy is not NELAC certified for VPH, but is certified for VPH in NC.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary Shealy Consulting LLC Lot Number: MD04016

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	LW Blank	Aqueous	04/01/2011 1430	04/04/2011
002	LW Control	Aqueous	04/01/2011 1431	04/04/2011
003	LW 0.39	Aqueous	04/01/2011 1432	04/04/2011
004	LW 0.60	Aqueous	04/01/2011 1434	04/04/2011
005	LW 0.91	Aqueous	04/01/2011 1435	04/04/2011
006	LW 1.4	Aqueous	04/01/2011 1436	04/04/2011
007	SS Blank	Aqueous	04/01/2011 1445	04/04/2011
008	SS Control	Aqueous	04/01/2011 1446	04/04/2011
009	Simstream	Aqueous	04/01/2011 1447	04/04/2011
010	SS 3.2	Aqueous	04/01/2011 1448	04/04/2011
011	SS 4.9	Aqueous	04/01/2011 1450	04/04/2011
012	SS 7.5	Aqueous	04/01/2011 1451	04/04/2011
013	SS 11.6	Aqueous	04/01/2011 1452	04/04/2011

(13 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary Shealy Consulting LLC Lot Number: MD04016

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	LW 0.39	Aqueous	Dissolved Copper	200.8	2.9		ug/L	7
004	LW 0.60	Aqueous	Dissolved Copper	200.8	5.0		ug/L	8
005	LW 0.91	Aqueous	Dissolved Copper	200.8	7.3		ug/L	9
006	LW 1.4	Aqueous	Dissolved Copper	200.8	11		ug/L	10
009	Simstream	Aqueous	Dissolved Copper	200.8	14		ug/L	13
010	SS 3.2	Aqueous	Dissolved Copper	200.7	0.040		mg/L	14
011	SS 4.9	Aqueous	Dissolved Copper	200.7	0.051		mg/L	15
012	SS 7.5	Aqueous	Dissolved Copper	200.7	0.077		mg/L	16
013	SS 11.6	Aqueous	Dissolved Copper	200.7	0.11		mg/L	17

(9 detections)

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04016-001

Description: LW Blank

Matrix: Aqueous

Date Sampled: 04/01/2011 1430

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0250	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 5 of 17

Level 1 Report v2.1

ICP-MS

Client: **Shealy Consulting LLC**Laboratory ID: **MD04016-002**Description: **LW Control**Matrix: **Aqueous**Date Sampled: **04/01/2011 1431**Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0257	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria,

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 6 of 17

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04016-003

Description: LW 0.39

Matrix: Aqueous

Date Sampled: 04/01/2011 1432

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0305	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	2.9		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 7 of 17

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04016-004

Description: LW 0.60

Matrix: Aqueous

Date Sampled: 04/01/2011 1434

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0329	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	5.0		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 8 of 17

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04016-005

Description: LW 0.91

Matrix: Aqueous

Date Sampled: 04/01/2011 1435

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0337	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	7.3		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

105 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 9 of 17

Level 1 Report v2.1

ICP-MS

Client: **Shealy Consulting LLC**Laboratory ID: **MD04016-006**Description: **LW 1.4**Matrix: **Aqueous**Date Sampled: **04/01/2011 1436**Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0345	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	11		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 10 of 17

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04016-007

Description: SS Blank

Matrix: Aqueous

Date Sampled: 04/01/2011 1445

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0352	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 11 of 17

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04016-008

Description: SS Control

Matrix: Aqueous

Date Sampled: 04/01/2011 1446

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0400	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	ND		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 12 of 17

Level 1 Report v2.1

ICP-MS

Client: Shealy Consulting LLC

Laboratory ID: MD04016-009

Description: Simstream

Matrix: Aqueous

Date Sampled: 04/01/2011 1447

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	04/06/2011 0408	KJC	04/04/2011 1726	56597

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.8	14		1.0	ug/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

ICP-AES

Client: Shealy Consulting LLC

Laboratory ID: MD04016-010

Description: SS 3.2

Matrix: Aqueous

Date Sampled: 04/01/2011 1448

Date Received: 04/04/2011

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0759	KJC	04/04/2011 1958	56611

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.040		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 14 of 17

Level 1 Report v2.1

ICP-AES

Client: **Shealy Consulting LLC**

Laboratory ID: **MD04016-011**

Description: **SS 4.9**

Matrix: **Aqueous**

Date Sampled: **04/01/2011 1450**

Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0804	KJC	04/04/2011 1958	56611

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.051		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 15 of 17

Level 1 Report v2.1

ICP-AES

Client: **Shealy Consulting LLC**Laboratory ID: **MD04016-012**Description: **SS 7.5**Matrix: **Aqueous**Date Sampled: **04/01/2011 1451**Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0810	KJC	04/04/2011 1958	56611

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.077		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 16 of 17

Level 1 Report v2.1

ICP-AES

Client: **Shealy Consulting LLC**Laboratory ID: **MD04016-013**Description: **SS 11.6**Matrix: **Aqueous**Date Sampled: **04/01/2011 1452**Date Received: **04/04/2011**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.7	200.7	1	04/07/2011 0816	KJC	04/04/2011 1958	56611

Parameter	CAS Number	Analytical Method	Result	Q	PQL	Units	Run
Dissolved Copper	7440-50-8	200.7	0.11		0.0050	mg/L	1

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the PQL

J = Estimated result < PQL and \geq MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Shealy Environmental Services, Inc.

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Page: 17 of 17

Level 1 Report v2.1

SECTION 5

APPENDIX C

SHEALY CONSULTING, LLC.
ACUTE REFERENCE TOXICANT CONTROL CHART FOR C.DUBIA
REFERENCE TOXICANT = COPPER (AS CUPRIC CHLORIDE)

Apr-11

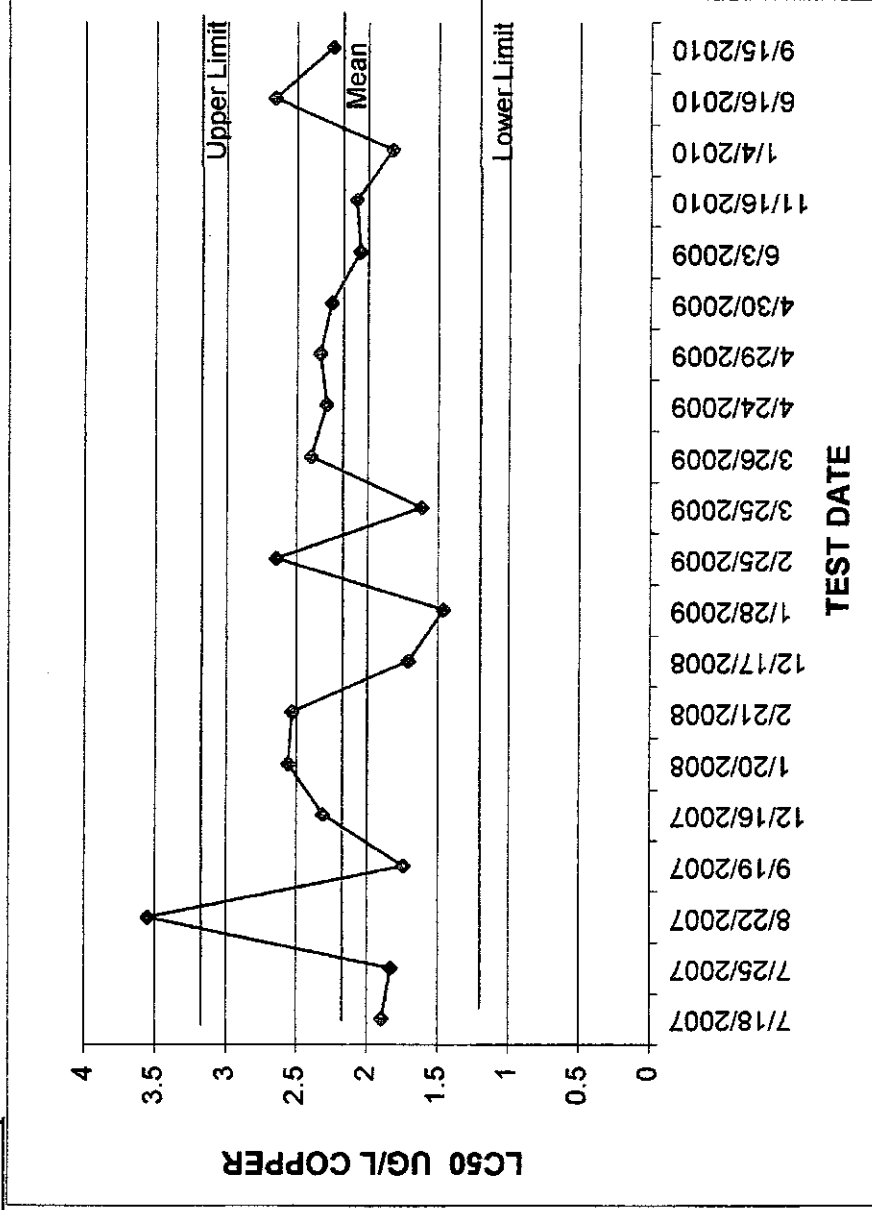
Values normalized to hardness of 25 mg/l

Data Point Test Date LC50 (ug/L Cu, 48Hours)

1	7/18/2007	1.895
2	7/25/2007	1.832
3	8/22/2007	3.553
4	9/19/2007	1.742
5	12/16/2007	2.311
6	1/20/2008	2.56
7	2/21/2008	2.533
8	12/17/2008	1.711
9	1/28/2009	1.465
10	2/25/2009	2.651
11	3/25/2009	1.614
12	3/26/2009	2.402
13	4/24/2009	2.292
14	4/29/2009	2.34
15	4/30/2009	2.261
16	6/3/2009	2.059
17	11/16/2010	2.085
18	1/4/2010	1.822
19	6/16/2010	2.657
20	9/15/2010	2.249

MEAN 2.2017
SD 0.476143842
2(SD) 0.952287683

UPPER LIMIT = 3.154UG/L
LOWER LIMIT = 1.249 UG/L



Attachment K

WQS WER Variance Form – Signed by DEQ PRO Regional Manager

Water Quality Standards Variance Form

Documentation that water quality standards variance or water effect ratio (WER) procedure was duly processed according to state law. When the steps outlined below are followed and the form is signed, then a 'blanket' certification from the Attorney General's Office applies and states that the variance or WER was duly adopted according to state law. This is a necessary component for EPA approval of water quality standards variances or WERs.

- the variance or WER has been approved by the Department of Environmental Quality,
- the variance or WER applies to only the applicant or permittee in this proceeding,
- the variance or WER shall not prevent the maintenance and protection of existing uses or exempt the discharger or regulated activity from compliance with other appropriate technology or water quality-based limits or best management practices,
- the variance or WER was described in the 30-day public notice published for the permit and public comment was requested,
- the variance or WER public notice for the permit was published in a newspaper of general circulation in the area of interest,
- if a public hearing was held on the variance or WER, the public notice of hearing was published in a newspaper of general circulation,
- if a hearing was held, the State Water Control Board voted to grant the variance or WER request,

- the variance expires at the time of permit expiration, unless the permittee makes a showing that the variance still applies, (This item is applicable to variances only, not to WERs)

- the variance and WER have been duly processed with the permit according to all applicable laws and regulations and is so certified by the position authorized to approve the VPDES permit (signature below):

VPDES Permit No. **VA0060402**

Facility Name **McKenney Sewage Treatment Plant (STP)**

Facility Location **Route 1010 Extension, McKenney VA 23872**

Effective Date of Permit (Modification) _____

CERTIFIED: _____
Signature Date

Title

VA DEQ AGO Variance/WER Certification Form 3/29/99 Updated 05/20/09

This form must be signed by Regional Director for AGO Certification to apply.